SEPTEMBER, 1960

Traffic Safety

A NATIONAL SAFETY COUNCIL PUBLICATION

A BLUEPRINT FOR LEGISLATIVE ACTION

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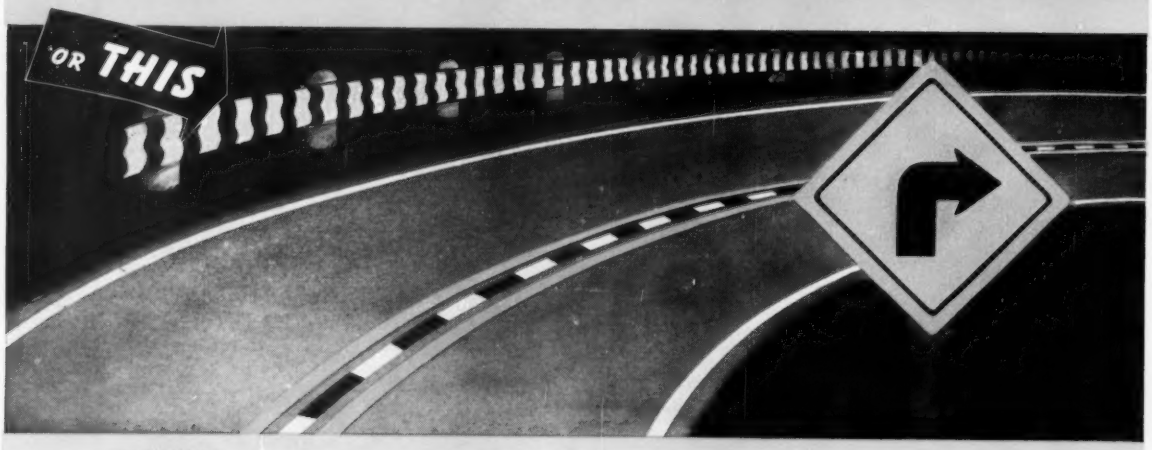

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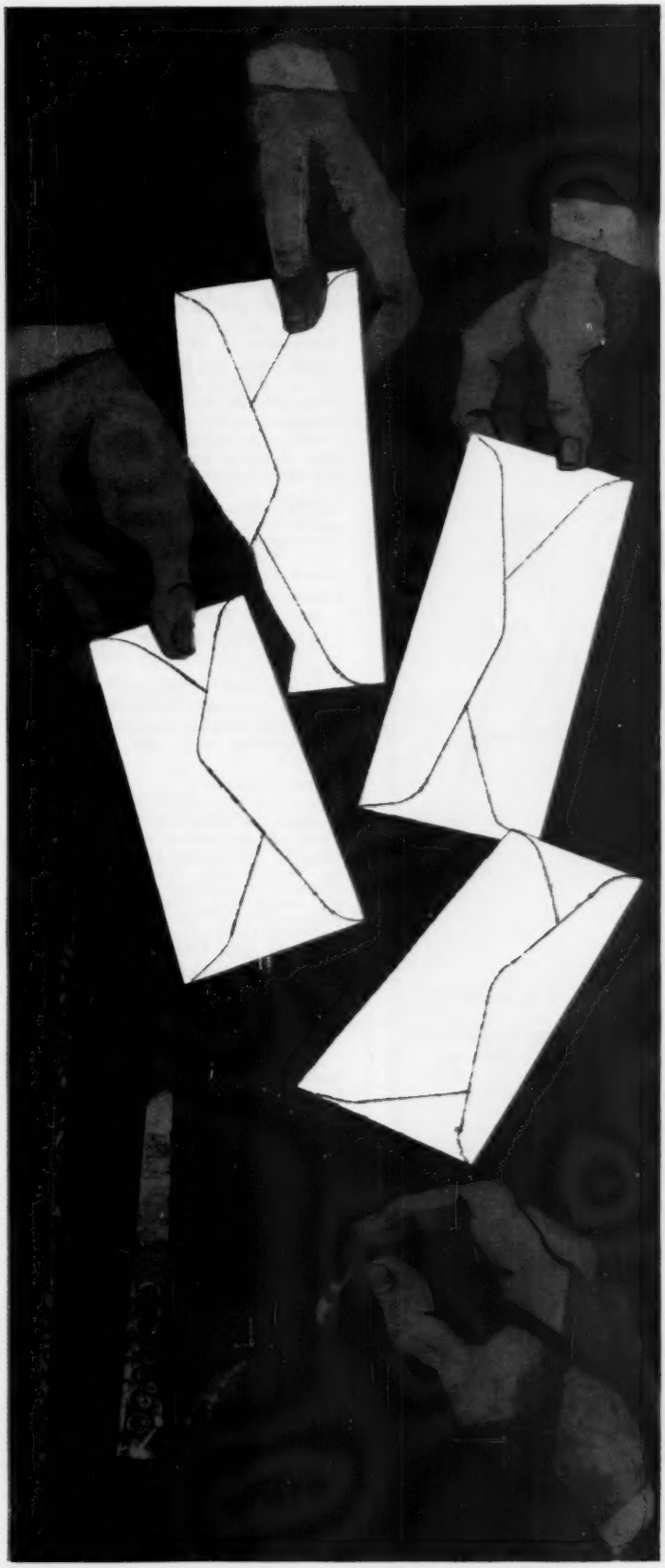

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By Lois Zearing, Librarian, NSC

Accidents

ICC Accident Reporting Proposals Would Hurt Safety, ATA Charges. *Highway Traffic,* June, 1960, p. 11.

Statistics on Pupil Transportation, 1957-1958. Oct., 1959 1pp. U. S. Department of Health Education and Welfare, Office of Education, Washington 25, D. C.

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Automobiles

The Safe Car. James J. Ryan. *Mutual Insurance Bulletin,* June, 1960, p. 12-15.

(This article is based upon research conducted by Professor Ryan at the University of Minnesota, which points out the most effective design and economical means to produce "the safe car.")

Belts

Automotive Safety Belts: A Report of Public Health Service Activities. March 29, 1960. 8pp. U. S. Department of Health, Education and Welfare, Public Health Service, Accident Prevention Program, Washington 25, D. C.

Seat Belts: No Longer Why, But Why Not. J. Wilfred Gagen. *Today's Health,* July, 1960, p. 26-29, 72-74.

Bicycles

Waterbury, Conn., Commissioners Plan Bike Paths in Parks. *American Bicyclist and Motorcyclist,* May, 1960, p. 30.

Conferences

Summary of Proceedings. Governor's Conference on Traffic Safety, April 2, 1960, 37pp. Processed Yale University, New Haven, Conn.

Commercial Vehicles

Immediate Written Reports Speed Motor Cargo Dispatching. Charles E. Parker. *Commercial Car Journal,* June, 1960, p. 124-125, 214-215.

(Safety lane, dispatcher, and service manager are linked by TelAutograph system to cut delay in clearing rigs for duty or scheduling them into the shop for repairs.)

Driver Education

Instructor's Outline for Safe Winter Driving: For use in high schools and adult driver education and in driver improvement programs. Supplement to Teacher's Manual for "Sportsmanlike Driving." 1960. 30pp. American Automobile Association Foundation, Washington 6, D. C.

Sioux Falls Saves its School Driver Training. Durand C. Young. *Traffic Digest and Review,* June, 1960, p. 20-23.

(This community of 65,000 people believed its youth should learn how to operate an automobile safely and was willing to pay higher taxes to teach them.)

Status of Driver Education in the United States. Norman Key. 1960. 76pp. National Commission on Safety Education, National Education Association, 1201 Sixteenth St., N. W., Washington 6, D. C. Price $2.00.

(A study of courses as described by state and local school systems based primarily on a questionnaire survey.)

Drivers and Driving

Denver's Driver Improvement School. Robert V. Hudson. *Traffic Digest and Review,* June, 1960, p. 12-13. (Instruction is provided under the auspices of the court without charge to students or taxpayers.)

Driver Training in Miami. *Firemen,* May, 1960, p. 22.

(Driver training program for fire department drivers.)

For First-Time Driver on Expressway—Learn the Course, Drive With Attention. Leo G. Wilkie. *Cook County Highways,* May, 1960, p. 4-6.

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Volume 57 Number 3 September 1960

A NATIONAL SAFETY COUNCIL PUBLICATION

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TRAFFIC SAFETY is dedicated to the prevention of traffic accidents through the presentation of objective information and responsible opinion to official agencies, public support groups and the motor transportation industry. The views expressed do not necessarily reflect the beliefs or policies of the National Safety Council, but they are presented in the conviction that the pressing social problem of traffic accidents can best be resolved through freedom of expression and open debate.

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BETWEEN STOPS

WHAT'S become of the timid lady driver of yesteryear?

A male NSC staff member who recently returned from several thousand miles of toll road travel in the eastern part of the country is asking this question.

He reports that two out of three drivers who zoomed past him, as he cruised along at the speed limit, were ladies. Moreover, the lone driver he saw stopped by the highway patrol was —a woman!

Is this a representative picture of today's woman driver—or did this male motorist just happen to hit the toll roads when the lady speed demons were abroad?

It would be interesting to get the views of TRAFFIC SAFETY readers—especially those who police the toll roads.

What do you think — are the ladies becoming the heavy-footed sex?

JUNE TOLL UP FROM '59

Six month total lower than first half of last year

by H. Gene Miller

MOTOR-VEHICLE deaths in June totalled 3,320, about 2 per cent more than the total of 3,260 in June a year ago. This was the third month in a row to show an increase, although the 2 per cent increase was well below the 10 per cent and 4 per cent increase, respectively, for April and May.

Despite increases in the last three months, the six-month total of 17,090 was still 10 deaths below the total of 17,100 for the first six months of 1959.

Travel for six months was running about 3 per cent more than during the same months of the previous year. This increase, coupled with the slight decrease in deaths produced a mileage death rate of 5.0 (deaths per 100,000,000 vehicle miles). This was the lowest six-month mileage death rate on record, and compares with 5.1 for the same months of 1959.

The relatively favorable death rate for six months appears to be due primarily to safer driving in rural areas. In urban areas, deaths were up 11 per cent in June and up 5 per cent for six months.

Disabling injuries during the first six months of the year are estimated at about 600,000. These are injuries resulting in disability beyond the day of the accident and do not include minor injuries which undoubtedly total many hundreds of thousands more.

Among 49 states reporting June experience, 24 had fewer deaths than last June, and 25 had increases.

For six months, 27 states showed decreases, one reported no change and 21 had increases.

Exceeding the national experience, cities registered a substantial 11 per cent increase in June, according to reports from 690 cities over 10,000 population. For six months, these cities showed a 5 per cent increase from last year.

Cities with fewer deaths in June totalled 129, compared with 128 having more deaths, 433 showed no change (mostly perfect records).

For six months, 222 had decreases while 268 had increases with 200 showing no change.

In June, 513 of the 690 cities reporting had perfect records. Of these, the three largest were: Rochester, N. Y. (345,600), Toledo, Ohio (343,700) and St. Paul, Minn. (313,400).

For six months 233 of the cities still had perfect records. Of these the

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H. Gene Miller is director of the National Safety Council's research and statistics department.

Leading at the End of June

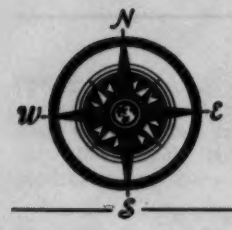
States

New Hampshire	— 31%	New York	— 9%	Omaha, Neb.	— 65%
Rhode Island	— 30%	Texas	— 8%	Grand Rapids, Mich.	— 56%
West Virginia	— 25%	Nevada	— 8%	Worcester, Mass.	— 50%
Nebraska	— 23%	Illinois	— 6%	Miami, Fla.	— 43%
Vermont	— 21%	Virginia	— 5%	Oakland, Calif.	— 41%
Iowa	— 20%	Oklahoma	— 4%	Houston, Tex.	— 38%
Arizona	— 18%	Pennsylvania	— 3%	El Paso, Tex.	— 38%
Montana	— 18%	Kentucky	— 3%	Birmingham, Ala.	— 33%
Oregon	— 17%	Maine	— 3%	Providence, R. I.	— 29%
North Dakota	— 17%	North Carolina	— 2%	Boston, Mass.	— 24%
Connecticut	— 15%	Wisconsin	— 1%	Chicago, Ill.	— 23%
New Mexico	— 15%	South Dakota	— 1%		
Arkansas	— 14%	Alabama	— *%		
Kansas	— 10%				

Cities

New York, N. Y.	— 21%
Akron, Ohio	— 21%
San Diego, Calif.	— 17%
Milwaukee, Wis.	— 12%
St. Louis, Mo.	— 10%
Atlanta, Ga.	— 9%
Ft. Worth, Tex.	— 6%
Portland, Ore.	— 4%
San Francisco, Calif.	— 2%

*Less than .5%



Today's Traffic

These are real cheaters

Motorists are being told by the National Safety Council that Hollywood-style sun glasses—the type with unusually wide frames—are virtual blinders for drivers. According to a Connecticut insurance company, accidents involving drivers wearing such glasses have already occurred, and the Connecticut Motor Vehicle Department has issued a warning on their use.

Overweight is driving hazard

According to Dr. Rosario Robillard of Montreal, Canada, the fat automobile driver is more accident-prone than the slim driver, and his accident rate is directly proportional to his degree of overweight. Dr. Robillard believes that when obesity is pronounced, a driving license should be restricted to use of private automobiles, and that when it is extreme the license application should be denied.

Reckless denied church burial

Bishop Maurice Schexnayder of Lafayette, La., has issued a pronouncement refusing Christian burial to Roman Catholics declared by the competent police officials to have been criminally negligent in highway accidents resulting in their deaths. The bishop's action was taken the week following a four-car collision in which nine persons were killed. Unconfirmed reports state that a $10 drag race bet led to the collision.

And then there was one

A ruling that the Lubbock, Tex. city zoning ordinance does not permit the operation of go-karts on race tracks was handed down recently by the city zoning board of adjustment. But the ruling does not affect a go-kart track that was in operation at the time the site was annexed to the city. This track may continue to operate.

More space for missiles

Many states will have to increase the vertical clearance under bridges which pass over rural sections of the National Interstate and Defense Highway System—to comply with a federal order, issued at the request of the Defense Department, which requires a minimum clearance of 16 feet beneath these overpasses to provide greater freedom for trucks carrying missiles.

New seat belt angle

From Oregon comes the news of a safety belt that saved a life in a most unusual manner. A driver lost control of her car. The vehicle left the road and overturned in a stream. Trapped, the driver managed to cling for 13 hours to the rings attaching the belt to the car floor. She had only a four inch air space in which to breathe.

Put it on tape

One of our new states has scored a "first" in courtroom use of modern techniques. The Council of State Governments reports that Alaska will replace court reporters with tape recorders in its court system. This is the first regular courtroom use of tape recorders anywhere in the U. S. The new system assures exact repetition of testimony and costs are expected to be lower.

LET'S TRAIN FIVE MILLION ADULT DRIVERS A YEAR

Behind-the-wheel ineptitude and driving ignorance are killing us. Driver education of adults in massive doses is urgently needed.

by Maxwell N. Halsey

THE 442 persons we killed over the Fourth of July holiday are eloquent testimony that the great mass of our adult driving population needs survival training for our highways.

We are killing slightly over 100 persons in traffic each day. The time has come to evolve plans to give driver education courses to five to 10 million adults a year.

We currently train one and four tenths million of our youth annually. This is highly important and we need more of it. However, high school driver education, which is a fundamental accident prevention tool, has overshadowed adult driver education which has an equally high accident prevention potential—now largely ignored.

Our programs for training the nation's youth must be pressed forward vigorously. So far we have only succeeded in reaching a point where 38 per cent of the potential drivers enrolled in our schools receive a standard course. The rate of enrollment gain from 1958 to 1959 of only 171,810 students suggests it will be a long time before we achieve universal high school driver education. It is sobering, too, to realize that even when we do reach this stage there will be no immediate influence on the total accident experience because the number of young drivers is such a small fraction of the total driving population.

The following analogy points up the size of the problem. Suppose we have a bucket of white paint, representing the total driving population, which we wish to change to blue, representing a totally trained and skilled driving population. Each year we are pouring in a teaspoon of blue paint. Obviously it will take a very long time to end up with the desired pure blue, especially since some of the blue we are pouring in is a watered down or pale blue because of substandard courses.

So it seems inescapable that if we spend all our educational efforts on the young driver we are making a grievous mistake which will delay for many years realization of the life saving potential of driver education. The cost of such delay over the next ten years would be staggering. That is why we should start now to make plans for large scale training of adult drivers.

Let's look at the number of adult drivers we are training today.

In 1958-59 there were 1,567 high schools which gave driver instruction to 81,389 adults. Very rough estimates are that 4,000 to 5,000 professional driving schools gave instruction to from one to two million adults, although this training was probably of a lesser quality than standard high school courses.

Some 129 local traffic violator's schools probably reached about 129,000 adults with very limited instruction, and records of motor vehicle department hearings suggest that about 150,000 were exposed to hearings extended in time sufficiently to represent some degree of instruction.

These rough estimates total somewhere between 1.3 and 2.3 million a year. With over 80 million drivers, this rate of application and unevenness of quality is certainly far short of need.

Elements of a National Program

If adult driver education is to make its maximum contribution as a clear-cut tool of accident prevention comparable to the tools of engineering, police, courts and driver license administration, a national project should be set up with this as its objective. This is essential to provide strong leadership and pull together the efforts of several organizations already doing excellent work in this field. Adult driver education must come to be recognized as a distinct field having equal status with high school driver education.

Here is what we need for its development and promotion:

1. Adoption of adult driver education by some national organization as a specific major project with full-time specialized staff.

2. $500,000 for a three year operation.

3. Research to find and test more effective ways of training adults.

4. Coordination of efforts of all major groups now operating in this field.

5. State and national conferences on adult driver education.

6. Pilot jobs to test systems.

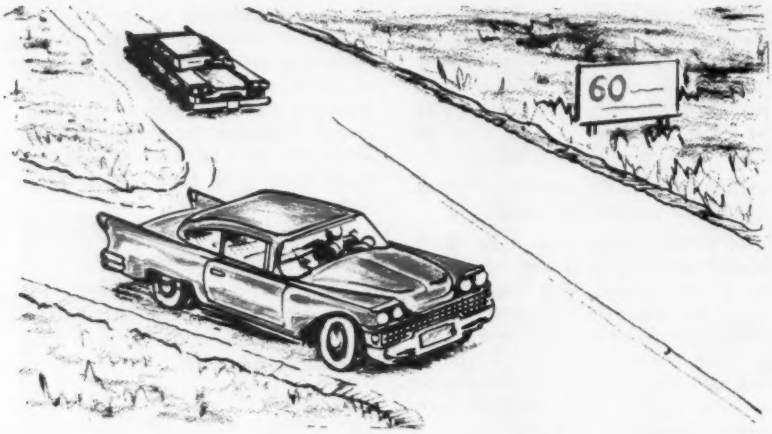
7. A massive nationwide emphasis program, similar in depth to the "Slow Down and Live" program to encourage adults to become more interested in driving instruction and to encourage those who give it, or arrange to have it given, to expand operations.

Here are some of the larger elements of such a program which should be examined.

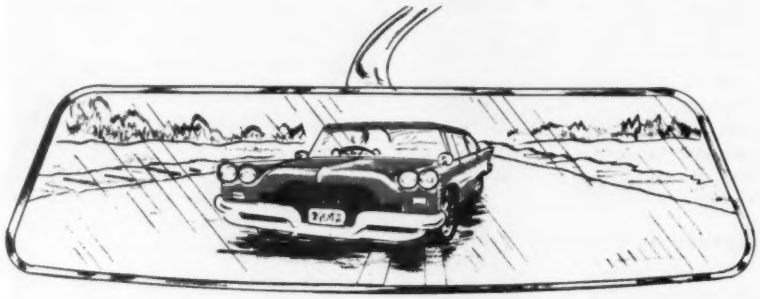
Broadening high school courses—The natural extension of high school

We train only 38 per cent of the potential drivers enrolled in our high schools. This training should be expanded, and a vigorous program should be undertaken to train five million adult drivers every year.

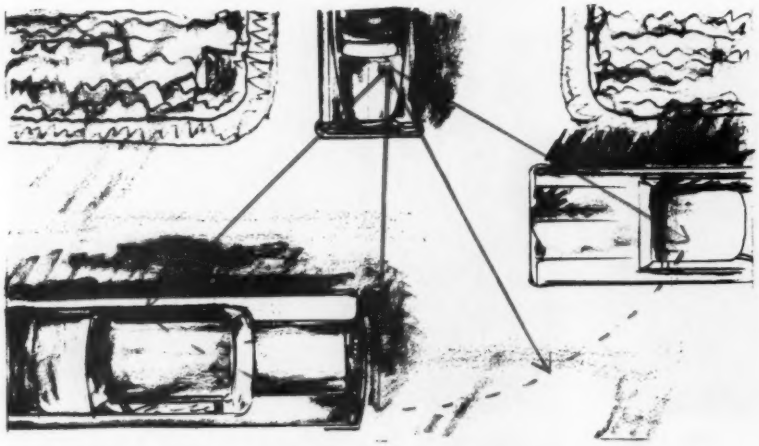
Maxwell Halsey, a traffic safety consultant with 35 years of experience in this field, is author of *Let's Drive Right,* a driver education text used widely in high schools, and also of the recently published *Skillful Driving* which utilizes the situation approach as an adult driver education teaching technique.



Courses for adult drivers should make use of illustrations and short text covering every conceivable situation in which driver may find himself. Here, motorist is warned of need to properly judge speed of oncoming car before pulling onto high speed highway.



Driver should be alerted to danger that may approach from rear. Instruction in use of rear view mirrors helps him cope with situation.



Importance of driver's action after he has made stop at stop sign is stressed here. Wrong move at this point can cancel value of stop.

courses to include parents has many advantages, and further extension to include other adults not having students in the school is intriguing.

However, if a major attack is to be mounted then some thought should be given to the types of adult courses needed—total hours, fees, costs and numerous alternatives. Merely making slight adjustment in the regular 30 hour classroom and six hour behind-the-wheel course is not enough. We must do market research of adult training needs and then tailor our courses.

For example, the woman of 40 who inherits a car and has never driven would need a different course than one who is used to driving in the community and on back roads but is afraid to tackle big city driving or the expressways and high speed toll roads, or the woman who wants to do a better job of parking and backing.

A man taking over a new position which requires more driving than he has been accustomed to would wish a different type of instruction than a man seeking a position which calls for the operation of a vehicle such as a delivery truck.

Young Drivers, Too

Young adults who have missed driver education in high school would want a basic course, while those who have had driver education in school might want an extensive "graduate" course.

A company with a strong off-the-job safety program could use the adult driving school to offer a "shared expenses" type of course to employes' families; a judge could refer a violator in obvious need of thorough training; a motor vehicle department could send a person who has failed a driver license exam twice, or who has started to build a bad driving record.

No single course will meet this wide range of needs. Exploration should be made of possible types of courses which our high schools could give, such as the following:

Survival Course: Restricted to 200 practical driving situations. No parking, backing, gear shifting, science or "by-product value items." No effort to provide smoothness, or collateral values. Sole objective to keep person

alive. Perhaps ten hours classroom, four hours behind-the-wheel on highways only. A survival "plus" expansion of this could be offered with 20 hours classroom and six hours behind-the-wheel on the highway.

Super Driving Course: This would require the full 30 hours of classroom and eight hours of behind-the-wheel training. By leaving out the "history of transportation" and all collateral subjects, time saved could be poured back into more depth in safe driving practices, defensive driving, special handling in heavy traffic, on high speed toll roads and limited access highways. It should be able to turn out a truly expert driver. Such a course including the collateral subjects would require 40 to 50 hours. Naturally, a suitable fee would be charged.

Limited Course on Parking, Backing, Manipulation: This could be very attractive to the fair sex, many of whom find these to be their driving weaknesses. About 10 hours of instruction could be scheduled. It could also be used as a unit to be taken in advance by those who wish the broader courses.

Limited Course on Heavy Traffic: This covers driving in big city downtown traffic and heavy expressway traffic. (Perhaps 10 hours.)

This proposed battery of four courses may sound visionary and unrealistic to many at this time. But given a sufficient market developed through national promotion, and development of a series of training units within these four categories, the concept appears to have merit.

Resolving problems of which training can be done inside the school, outside of school hours, or outside of school operations altogether, will be difficult. If comparable fees are charged for courses, expected friction with professional driving school businesses might be lessened. Advances in the training of adult drivers cannot be made unless a wider range of treatment is made available. Regardless of who does the job, it must be done well.

Let's examine other avenues of training.

Professional Driving Schools: The inherent problem here is the unhappy fact that to get customers these schools have only to guarantee that the graduate will be able to pass a drivers license examination, and at present this is a relatively simple matter. This minimum effort in no sense turns out a safe or skillful driver.

Two steps may have to be taken before this weakness can be overcome. First, motor vehicle departments may have to announce publicly that the licensing examination, because of economic reasons which are valid, is only a minimum measure, that the examination alone does not prove that the applicant who passes it knows all the safe driving practices and defensive driving techniques, or has mastered the most common practical driving situations. They may have to go even farther and state publicly that to become a really safe driver it is necessary to take an approved course meeting minimum standards. Much misunderstanding would be removed and the accident prevention climate would be healthier if this were done.

Stiff Course Needed

The second step to support this action by motor vehicle departments must be taken by high school driver education teachers and supervisors of state education departments. This would be preparation of a really tough course of training of at least 30 hours of classroom and six hours of behind-the-wheel instruction. This course would be the forerunner of action by the motor vehicle departments to establish a thorough examination which no one could pass who had not taken the tougher recommended course or its equivalent.

When it is discovered and proved that persons who take the average professional driving course are unable to pass a truly safe driving exam, then this important distinction will be made clear.

We should begin now to license and supervise our professional driving schools and begin efforts to raise the standards of their instruction. In this process the legitimate interests of the small business man operating the schools must be protected. The owner of a professional school is entitled to the same reasonable profit as any other business man, but he must attain this without harming the best public interest through sloppy services or misrepresentation.

Among possible steps which could be taken are:

1. License and supervise these businesses and encourage them to offer better courses, or an additional super course, both with a higher fee. A plan should be laid out by the state for slowly increasing the standards each year, with a year's advance notice, with the school permitted increased prices because of the state's higher requirements.

2. Help develop a standardized procedure of instruction. Classroom instruction and use of a training manual or book which the student can keep should be encouraged.

3. When a course reaches a high enough level, offer to have cities use it for violator schools and have states use it for license violator schools, on a referral basis.

Community Violator Schools: This well established pattern sends to a school persons who, by committing an offense, indicate the need for training. In some cases they attend in lieu of paying a fine or a part of a fine. The quality of schools countrywide is very uneven. In most cases they are composed of one or more evening sessions, including lectures, mostly by police, films and demonstrations.

The principle is excellent. The fact that many who are not violators voluntarily attend shows some demand for adult education. The future need is in the area of improved quality, formalization, selectivity and depth. The following might be considered.

- Charging a fee to make it possible to do a better job.
- Formalizing the course with a curriculum and using teachers as well trained as those in high school courses.
- Expanding the amount of course time and using texts which can be kept.
- Covering in depth only subjects relating to violations of those attending.
- Utilizing high school operated courses, evenings and weekends.
- Utilizing qualified professional schools.
- Employing some kind of testing to see who would benefit by this kind of instruction.

License Violator's Schools: If there is merit in a local judge concluding

that certain motorists convicted of a single traffic offense would benefit by receiving some education at a violator's school, there is even more logic in a motor vehicle department, through its driver improvement section, concluding that a motorist who has begun to establish a bad driving record, thus violating the provisions of his license, needs even more to receive safety education.

Such a person can properly be called a license violator and specific arrangements should be made for his training. Schools for this purpose could logically be called "license violator schools." But for public relations reasons they should be called "driver improvement schools."

It is proposed that each state set up a system of such schools to make an effort in some depth, through safety training, to "improve" the driver. Some foreward looking states, including North Carolina and California, are already exploring the worth of such a plan.

This idea is merely an extension of activities presently carried out by "driver improvement" sections of motor vehicle departments. It goes beyond suspension, restriction, probation and re-examination which at best constitute a very restricted form of driver improvement.

All most agencies have been able to do is extend the lengths of hearings and rely on the hearing officer to provide some safety education. At best, all that could be hoped for under existing programs would be some impact on attitude and perhaps explanation of a single troublesome maneuver. This is certainly all to the good as far as it goes, but it falls far short of sound training.

Every state should have good driver education courses to which adults who obtained licenses before high school courses were established, and who feel they need instruction, could go voluntarily, and to which the state could refer drivers in the interest of preserving the individual's driving privilege.

Let's look at the mechanics of state referral to such schools. A motorist begins to build a bad driving record. He has already received a warning letter from the motor vehicle department, but this fails to deter him and he is subsequently convicted of another violation. It is obvious some additional step must be taken.

He is called in for interview. The hearing officer reviews his record with him and decides that this particular license violator is the type that would benefit from a course in driver education. He might offer the man or woman the option of taking the course or having some action taken against his license.

The course to which the violator is referred could be one newly created by the state for this purpose, a high school course open to adults, existing local violator schools, or a specially selected high-standard professional driving school.

The driver having personally caused the state this trouble should logically be expected to pay for the training. With the alternative being loss of license, it is believed most violators would gladly pay for the training. In hardship cases the state might be able to make other arrangements.

Good driving courses have both instructional and attitudinal values. The mere process of going through the course can't help but make some adults look at driving a little more intelligently. The degree of this is presently impossible to measure, but must vary greatly with types of persons and courses.

Thus the selection of who should or should not be referred to a course is controlling. The obviously anti-social character who swears at the officer, tells the judge to hurry up and tell him his fine so he can "get the h - - l out of here" would gain little from the course. The obviously inept driver who

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Illinois' Program Wins Award

Thomas Morrill (center), member of the executive committee, board of directors, National Safety Council, presents Illinois' Gov. William G. Stratton with a Certificate of Achievement for outstanding performance in public traffic safety education by the state agencies in connection with the Council's Annual Traffic Inventory Program. Looking on is Robert A. Campbell, state safety coordinator. Morrill, also chairman of the board of governors, National Insurance Institute for Highway Safety of Washington, D. C., and vice president of State Farm Insurance Co., Bloomington, Ill., commended the governor, saying "This award for an excellent public safety education program symbolizes the successful multi-front statewide safety program in Illinois, which has set high standards of performance in the Traffic Inventory Program in areas of traffic engineering, accident records, driver licensing and school traffic safety education."

NEWS FROM CAPITOL HILL

THE Congress passed H.R. 5436, as amended, and sent it to the President for signature. The bill provides for a federal register of names of persons whose motor vehicle operator's license or permit had been revoked because of (1) driving while intoxicated, or (2) conviction of a violation of a highway safety code involving loss of life. The Roberts Committee report said that "incompetent and irresponsible drivers are a hazard to interstate commerce." The Bureau of the Budget urged that responsibility be left with the states. Prior to its action, the Senate held hearings on S. 3745, an identical bill, during which the National Safety Council testified.

The Senate Subcommittee on Surface Transportation held hearings on H.R. 1341, the Roberts bill to provide for standards for federally-owned motor vehicles. Maj. Gen. George C. Stewart testified in behalf of the National Safety Council and urged the federal government to take leadership in recognizing the value of proven safety devices by having them installed in government vehicles. (See Page 21, this issue.)

Study Exhausts

The Department of HEW appropriation bill, H.R. 11390, was amended on the Senate floor to include $1,000,000 to administer PL 86-493, the so-called Schenck bill, providing for a Public Health Service study of auto exhausts. Lab studies and field appraisals of conditions in various communities are to be undertaken. This sum is in addition to almost $5,000,000 for the Federal Air Pollution Control Act.

Congress has been giving widespread attention to mass transportation. It passed and sent to the President H.R. 11135, as amended, the National Capitol Transportation Act, to aid in the development of an improved transportation system for the District of Columbia. A federal agency is created to develop proposals for subways and surface rail lines, new railroad commuter service, and coordinated mass transportation. No part of the program thus developed is to be carried out without further legislation. Congress said that traffic congestion was the principal cause for the legislation and a rapid transit system the principal remedy.

A more general mass transportation measure, S. 3278 was passed by the Senate in amended form, over administration opposition. It authorized: (1) $100 million in interest-bearing federal loans to states and local communities for the development of commuter services and mass transportation systems, and (2) the use of urban planning grants, under the Housing Act of 1954, for comprehensive transportation planning.

Grim Picture

The Senate Banking and Currency Committee said that "the United States today is in the throes of an urban transportation crisis." Its report foresaw "a total breakdown" of metropolitan transportation networks due to the increase in motor vehicles, and concluded that it was the federal government's responsibility to stem the "decline and deterioration" of mass transportation services. "Traffic congestion," said the committee, "acts as a brake on the economic growth of the metropolitan areas" and thus of the nation as a whole. The Senate committee called for "immediate federal action."

Senator Williams (N.J.), the bill's sponsor, said: "We must, of course, build for this increase in the number of cars on the road. But we have failed to realize the consequences of our road-building effort if the serious decline in mass transportation is continued. The consequence must inevitably be either a virtual paralysis of urban transportation — which this country cannot afford—or a vast enlargement of our highway building program in urban areas (and a consequent increase in gas taxes)."

The Federal Highway Administrator announced that 84.5 million motor vehicle operators' licenses were in force in the United States during 1959, a 3½ per cent increase over 1958. This amounts to 1.2 licensed operators per registered motor vehicle in 1959. The administrator also announced that in 1959, for the first time, state highway-user taxes passed the $5 billion mark, with a total of $5.1 billion collected. This was a gain of 8.3 per cent over 1958. The figure includes fuel tax, vehicle registration fees and other vehicle and carrier fees.

The House Judiciary Committee favorably reported on S. 1806, with amendments, to revise the Transportation of Explosives Act.

Announce ITE Inventory Awards

Two states, 37 cities and one metropolitan county have been honored by the Institute of Traffic Engineers for their traffic engineering work in 1959.

The awards, which were based on information reported to the Annual Inventory of Traffic Safety Activities conducted by the National Safety Council, were made by a committee of judges of the Institute. Chairman of the committee was Thomas J. Seburn, a past president of the Institute and now associate director of the Yale Bureau of Highway Traffic. Other members were: John E. Baerwald, associate professor of traffic engineering at the University of Illinois; Donald S. Berry, professor of civil engineering at Northwestern University; and Adrian H. Koert, traffic engineer with the Insurance Institute for Highway Safety.

Traffic planning, traffic control measures, traffic improvements, and traffic engineering administration were among the items considered in making the awards. Approximately 800 cities and all states submitted entries in the Inventory program, which is basically designed to provide a self-evaluation of the traffic safety program of the city or state. No ranking was assigned by the Institute to the awards, which were all designated as "for maintaining a high level of performance in traffic engineering."

The states receiving awards were California and Michigan; the county was Dade County, Fla.

A Blueprint For Legislative Action

by Louis R. Morony

TRAFFIC safety is not an object or thing you can reach out and grasp when you want it. Actually, it is a completely negative condition, whose image is reflected only in the absence of accident. But, even though traffic safety is negative, we know there is a positive approach to it. We know that it is the product of doing a lot of things right. To do these things right, however, we first must know all there is to know about them—what must be done, how they should be done for greatest effectiveness, and why they must be done in the public interest—so that everyone will understand and do his part.

That was our approach when the Congress and the states began to plan the tremendous highway development program we are carrying out today. The highway plant of this country was allowed to deteriorate during World War II. Motor vehicle travel was curtailed by restrictions on manufacture of motor vehicles for civilian use, by gasoline rationing, and by shortages of vehicle parts and supplies available to the public.

Then, suddenly, the war was over. Millions of new motor vehicles, added to those already in service, began to flood and choke our tired old roads. Our highway departments were faced with a desperate situation. The public was demanding better roads, more capacity, and still more capacity, to accommodate the ever-increasing traffic volumes.

It was then the states turned to long range and statewide factual surveys of physical needs on which to base progressive programs of improvement. For it was only on the basis of such factual study that needs could be documented and costs justified. And when physical needs were measured according to engineering standards, when priorities were established according to urgency of need, and when annual costs for fixed periods of years had been forecast, the problem of providing means to accomplish what had to be done was resolved by legislative action. The people generally have supported the program, because they have understood what was needed.

The states stepped up to their responsibilities because the Legislatures,

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Louis R. Morony is director, laws division, Automotive Safety Foundation.

the lawmaking bodies, provided aggressive leadership. Ever since, the Legislatures of the several states have maintained an active and continuing interest in highway matters. Nationally, the United States Congress brought into being the greatest public works project in the history of the world in the current multi-billion dollar program of federal aid to highways, which lately has greatly speeded up our construction program.

There are a couple of things I want to emphasize here. One is that the Congress did not act until the public demanded; the states had documented needs, and long-range plans for improvement had been developed by the states. In other words, Congress was fully informed before it took that tremendous step. The other point is that the Congress and the State Legislatures stepped up to their responsibility for leadership, then saw to it that the job of highway improvement got under way. The highway law has not been overlooked, for it has been undergoing modernization by the Legislatures to meet new conditions.

USE Aspect Neglected

Because this is true, we are getting the kind of roads we are expected to need for years to come. The highways program not only is orderly, but it is progressive, with annual steps geared to anticipated future growth of traffic demand and need.

Now, I would like to raise the question: Who has the primary responsibility for seeing to it that the highways we have now, and will build in the next few years, can be USED, safely, economically and conveniently?

Without answering that one immediately, let me ask another: Can the states handle the traffic safety problems of the future with the same approach and at the same level of activity as today?

The U. S. Department of Commerce has predicted that by 1975 this nation will have 48 million more people than we have today, 42 million more motor vehicles, and 29 million more drivers piling up 509 billion more vehicle miles of travel annually. Further, it is anticipated that traffic accidents by that time will result in 14,000 more deaths per year, and that the annual cost of such accidents will be $4.1 billion higher.

Certainly, this means that the burden on State agencies charged with responsibilities in the field of motor vehicle ownership, operation and use will be increasingly heavier as time goes on. It means that the responsibility for traffic safety will grow heavier on you and me as individual citizens and as representatives of our respective organizations.

It means that Legislatures are going to have to exercise the same degree of leadership and continuing interest in matters relating to highway use as they have shown in highway development. The Legislature has the primary and legal responsibility for the safety and efficiency of highway USE, just as it has in the provision of adequate highway facilities.

The Legislature, representing the people, makes the laws which govern the highways and their use; it has created departments of state government and given them authority to administer those laws, and it appropriates the money for the manpower and facilities these agencies need to carry out their assigned functions.

Those involved in the safety movement play a very important role in all of this, for the Legislature and the administrative officials look to them for reflection of public opinion, and for encouragement and support. The public holds in its hands the success or failure of any traffic safety program. And, too, unless we have a really good official program, soundly based on factual knowledge of conditions and needs, the future in traffic safety will be more overwhelming than promising.

Must Follow Through

If we want action, we must look to the Legislature to lead the way. Unless and until the Legislature assumes its full responsibility for leadership, and for continuing watch over State affairs in the motor vehicle field, we will never achieve the degree of safety and efficiency we should have in our highway transportation system.

In contrast to the follow-up attention given to highway development, too often legislators enact laws in the motor vehicle field, then figuratively turn their backs and forget to check up on how well these laws are serving the people. Without encroaching on the prerogatives of the Executive branch, I believe the State Legislature has responsibility for taking stock from time to time of the performance and effectiveness of laws, and of all state functions bearing on ownership and use of the motor vehicle.

Legislative action in the field of highway operations and motor vehicle use too often is based on incomplete knowledge of problems and needs, often is accomplished in the name of expediency, and many times puts laws on the statute books without considering the impact they will have on the people of the state and on the administrative agency expected to carry them out.

Legislatures over the country have been well educated in highway affairs and on highway needs, as well as in what it will cost to overcome deficiencies. I am sure our lawmakers would like to be as well informed when they are asked to consider motor vehicle matters, and I know the people want them to have full factual knowledge before they act.

Picture Is Changing

There are encouraging signs that legislatures over the country are beginning to pay more attention now to the USE aspects of the highway transportation picture, and to the need for adaptation of the long-range factual-study approach to problems in that area. Much credit for this awakening interest must be given to the Council of State Governments, and to certain far-seeing legislators in a number of states.

For example, in California, under leadership of the Assembly Interim Committee on Transportation and Commerce, a factual long range study of functions bearing on ownership and use of the motor vehicle is being undertaken by the responsible departments of state government. The Automotive Safety Foundation is privileged to work with the Assembly Interim Committee and the departments concerned in directing this study project.

Functions receiving immediate attention are driver licensing, registration and titling of motor vehicles, financial responsibility, traffic law enforcement by the highway patrol, and highway operations (the latter including all highway department activities to safeguard and facilitate traffic movement, except the planning and construction of the physical highway plant). Action is being considered on

such functions as accident records and driver education, and one or both may soon be included in the project.

The California study is being carried out under mandate of Assembly Resolution 381, passed in the 1959 session. In the language of the Assembly Interim Committee, the study has for its purpose:

"To enable the legislature—in keeping pace with the dynamic growth of California—to come into possession of all the facts relating to motor vehicle ownership, operation and use, thereby permitting it to exercise its full responsibility in providing funds and authority to the responsible officials in order that USE of the highways and streets now built, or being built, will adequately serve the needs of the people efficiently and safely, both for the present and in the future."

This is the Interim Committee's statement of two ultimate objectives:

"1. To make it possible for the several departments to determine the extent of their future responsibilities in each functional area. This would be a factual and quantitative measurement of what each function must be geared to accomplish in the years ahead under the impact of continued growth of the State.

"2. To evaluate each function and its proper role in state government, to the end that a better common understanding and appreciation of its purposes and objectives might be realized by the Legislature, the public, and the officials themselves. This would be a qualitative measure of each function, to point up the value of its services, and how it can be made more effective."

I will not attempt a detailed explanation of how that study is being conducted, except to say that in each functional area, the responsible administrative agency has done the actual fact-gathering, is drawing its own conclusions in analysis and evaluation of facts, and will submit to the Assembly Interim Committee recommendations for any legislative action considered necessary. Where need for improvement in administrative policy and procedures is found, such changes or reforms are left to action of the department head and his staff. The departments plan to open up subjects under study to fresh thinking and viewpoints of interested people from the outside who can be helpful in reaching sound and far-seeing conclusions.

As Lee M. Backstrand, chairman of the California Assembly Interim Committee, has stated publicly, this study is not a "witch hunt" nor is it an efficiency study of departments, as this term is commonly understood. Rather, it is a factual study of functions and how the purposes and objectives of these functions can be fully met to provide best possible service to the people today and in the years ahead. In a foreword to the Interim Committee's outline of organization and procedure for the study, Chairman Backstrand has said:

"The study program . . . will enable administrative officials to develop a factual blueprint of immediate and long-term requirements as a basic guide for sound legislative and administrative action on a priority basis. This master blueprint will of necessity have to be reviewed periodically to keep pace with emerging problems in the years ahead.

"Through this study effort, the committee hopes to bring about a better understanding of the intent and purposes of the laws and their administration to the end that each function at all times will be equipped to keep abreast of the growing needs of the people of this state."

It seems to me that what the Legislative Committee is saying, too, is that in analysis of the functions, opportunity will present itself to these departments to make sure maximum use is being made of existing facilities.

The factual-study approach to the future does need legislative leadership in the areas of official responsibility. But that isn't enough. A lot of teamwork is required for successful conduct of such a project.

Active interest, participation and support of the public is a prime requirement, for after all it is the public which submits to regulations and controls, and pays the tax bill. It is interesting to note here that the business groups in California were instrumental in getting that job under way. And today, an advisory council of these same interests and city and county officials is working with the Assembly Interim Committee.

It goes almost without saying, too, that the leadership and support of the governor is another essential, as well as the full cooperation of the departments which perform under direction of the executive office.

If any state hopes to face the future with confidence, the people and the state government must take a good, hard factual look at what is being done, and at what lies ahead, so that planning can have the solid base of complete and thorough knowledge and understanding of problems and needs.

COMING EVENTS

Sept. 12-16, Knoxville, Tenn.

Traffic Court Conference. University of Tennessee. Contact James P. Economos, American Bar Assn., 1155 E. 60th St., Chicago 37, Ill.

Sept. 12-15, Chicago, Ill.

Annual meeting of Institute of Traffic Engineers (Edgewater Beach Hotel). Contact David M. Baldwin, Institute of Traffic Engineers, 2029 K. St., N.W., Washington 6, D. C.

Sept. 15-16, Rockland, Maine

Thirty-third Annual Maine State Safety Conference. Samoset Hotel. Contact Arthur F. Minchin, secretary, Department of Labor and Industry, State House, Augusta, Maine.

Sept. 22-23, Baltimore, Md.

Governor's Annual Safety Health Conference and Exhibit (Hotel Emerson). Contact Joseph A. Haller, executive chairman, Safety Conference, State of Maryland, 301 W. Preston St., Baltimore 1.

Sept. 26-30, Nice, France

Fifth International Traffic Safety Week.

Oct. 3-5, Nice, France

International Road Safety Congress. Contact World Touring and Automobile Organization (OTA), 32 Chesham Place, London, S.W. 1, England.

Oct. 10, Washington, D.C.

Ninth Annual Commissioners' and Governors' Conference on Metropolitan Washington Traffic Problems. Statler-Hilton Hotel. Contact Anthony L. Ellison, executive secretary, Metropolitan Area Traffic Council, 301 C St., N.W., Washington 1, D.C.

Oct. 17-21, Chicago, Ill.

Forty-eighth National Safety Congress and Exposition (Traffic Sessions—Congress Hotel). R. L. Forney, secretary, National Safety Council, 425 N. Michigan Ave., Chicago, Ill.

Let's Be Crossroads Christians

by Howard Pyle

ACROSS AMERICA thousands of families are traveling to visit friends and relatives, to see the natural splendors of our great land, and to pay homage at our historic shrines. Most such trips will be filled with joyful associations and profitable adventures for young and old.

But for a distressing number of these carefree travelers, shock, suffering, and tragedy lie ahead on the highway. Just who they will be, of course, no one knows. But we at the National Safety Council can determine, with painful accuracy, the number of lives that irresponsibility can cost us on an average day, week, or holiday weekend. And we know that vacation trips call for the most skillful kind of driving if the pleasure trip is to avoid being turned into a ghastly nightmare.

It can be done! Thousands will do it and thus prove their ability to pursue happiness in the family car without forfeiting the right to do so. Then there will be those who won't. The consequences will be sickening. The scenes will be tragically familiar—and so unnecessary.

This article by the National Safety Council president is reprinted by permission from *Together* (July, 1960). Copyright 1960 by Lovick Pierce, Publisher.

In darkening twilight on a heavily traveled thoroughfare, a uniformed patrolman signals with his flashlight to direct traffic around a grotesque pile of twisted metal and shattered glass. An ambulance attendant rises quietly after drawing a sheet over the body of a young mother. Nearby, too shocked and terrified to realize what a moment of carelessness has wrought—those who can never forget.

Belated Sorrow

In 85 out of 100 highway accidents, drivers, not machines, are at fault. Human error kills nearly 40,000 American men, women and children every year. We Christians cannot ignore the blunt fact that the divine commandment, "Thou shalt not kill," is being transgressed, however unintentionally, by many who profess to believe in it.

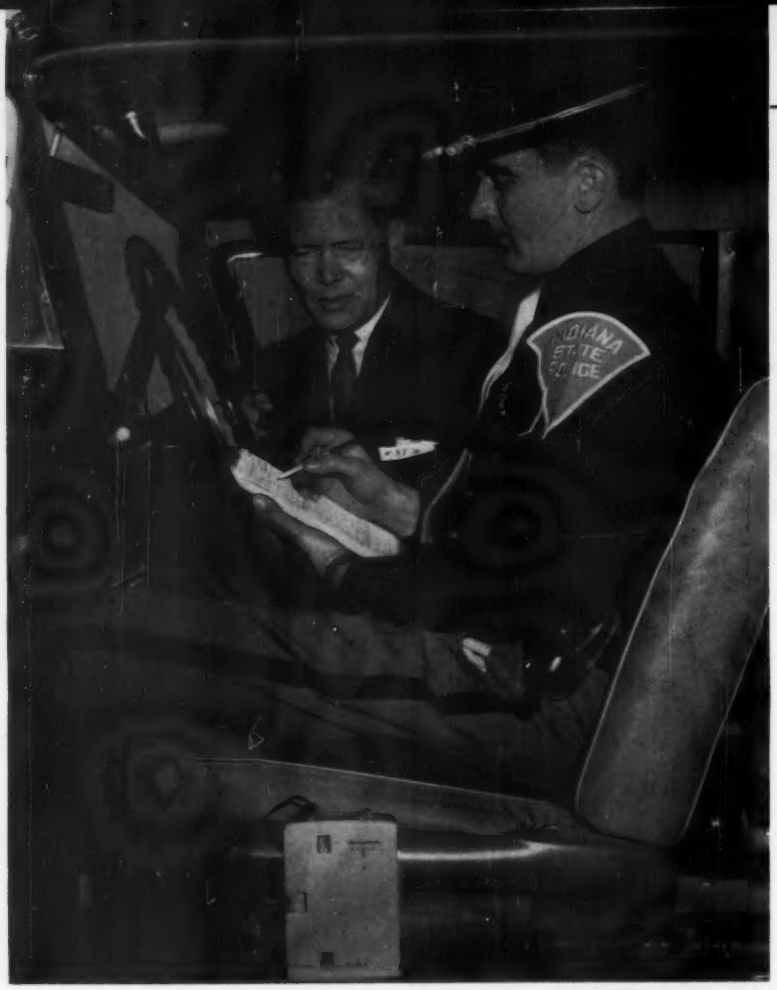
Guns, knives, and bombs are not the only death-dealing instruments of our age, nor are malice, anger, or passion essential attitudes of mind for murder. Kindly, peace-loving Christians become killers behind the wheel when they try to save a few seconds . . . or when they are preoccupied with conversation . . . or when they just plain don't think. Too late, they are sorry beyond words. They didn't mean to do it, but they have killed, and sinned against God and their neighbor.

Driving, then, must be understood to involve moral and spiritual responsibilities. It can be fatal to forget that other motorists and pedestrians are God's creatures, too, no matter how foolishly they may drive or walk. The good driver, the good Christian, tries to anticipate the errors of others, and he responds to emergencies with quick and careful action, not stubbornness, impulsiveness, willfulness, or vicious irritability.

On the road we literally must be our brothers' keepers. For the idea, "They must look out for me," we must substitute, "I must look out for them."

Jesus Christ did not teach impractical theory; neither did he reduce conduct to a simple code of rules. He brought mankind a way of life applicable to every age and situation. It is a religion which concerns the relationship of man to man in the here and now; it deals with more than just patterned rules of behavior. It must produce Christian attitudes.

Where? At all the crossroads of this life—not the least of them being those that for the want of Christian attitudes can be as deadly as any battlefield in history.



WGN's Alexander Fields, originator of Signal Ten, coaches McCarthy on handling of recorder used to interview violators. Note tiny mike at top of clipboard.

Tape Measure On Traffic

by Richard Williford

Traffic violators in Indiana "star" on Trooper Tim McCarthy's radio dramatizations of enforcement officer's side of the traffic problem.

It is dusk on a northern Indiana highway. A late model car descends a hill and streaks across a narrow bridge, gaining speed as it vanishes down the road. The posted speed limit is 65 m.p.h. Another car cruises near a junction that lies in the speeder's path. An Indiana State police trooper is behind the wheel. The driver of the speeding car pushes through the junction at well over 80. The trooper takes up the chase, his car straining at high speed to eat up the distance. The speeder keeps up the pace and it is a long time before he obeys the flashing red light and the siren's wail. Finally, he pulls over.

The trooper steps out onto the darkening highway. Not knowing what his man may be running from, the trooper automatically unfastens the safety strap on his holster as he approaches the car ahead.

Traffic whizzes noisily behind his back as he starts to question the violator. The background noise is too great. The officer asks the driver to follow him back to the patrol car. . .

That's Trooper Tim McCarthy at work and, chances are, the heavy-footed driver will talk himself right onto McCarthy's weekly radio show, "Signal Ten," broadcast over Chicago's WGN on Sunday evenings. If you've been stopped by McCarthy in Indiana, you may have unknowingly "starred" on the program.

Signal Ten tries to educate drivers while dramatizing the enforcement officer's side of the traffic problem. "The secret of its success," says Col. Harold S. Zeis, superintendent of the Indiana Troopers, "is that the dryness of traffic safety promotion is relieved by introduction of the human interest element. It's a happy combination of education and entertainment." Trooper McCarthy does this by carrying a small, portable tape recorder in his patrol car. When he curbs a violator he arranges to have the resulting interview take place in his car where the conversation is recorded without the violator suspecting that it is being taped. Tapes are later edited for identity and profanity, then are sent along to the station where WGN's production staff edits the interviews further and adds the announcer's commentary and mu-

sical backgrounds that are used as "bridges" between each interview. The announcer's script is written to point up the traffic hazards caused by a specific violation of the law, or a driving lapse on the part of a motorist. Such editorializing helps to set the mood of the program and provide dramatic impact.

Racing down dark highways after speeders who often try to defend their actions by saying, "I just wanted to blow the carbon out of my engine," or, "My kids here, were drivin' me crazy," seems like a dangerous way to gather material for a radio show. But it's all part of a normal tour of duty for Trooper McCarthy who packs his tape recorder to impress upon radio listeners the ease with which they can be killed on our highways.

Signal Ten—named for the Indiana State Police radio code for an emergency—was originated by Alexander Fields, WGN's public affairs manager, who first experimented with such a show, in conjunction with the Indiana State Police and the Ohio State Highway Patrol, when he was with an Ohio radio station several years ago. When he moved to WGN, Fields contacted the Public Relations Division of the Indiana State Police for a new series of programs and McCarthy was selected, in the fall of 1956, to make the tape recorded interviews on a trial basis.

Tim was enthusiastic about his new assignment but, while working out of the Dunes Park Post at Chesterton, it took nearly three months to round up enough useable tape for the first show. It was aired in February, 1957, and Tim has been doing the show ever since. When WGN was presented its second Alfred P. Sloan Award, a few weeks ago, for outstanding safety programming, Signal Ten was especially mentioned in the citation for "imaginatively attacking the problems of traffic law enforcement."

McCarthy's eight years as a trooper have built him a reputation as being strict, but fair. If he pulls you over, you can bet there's a flagrant violation involved. With his straightforward yet polite approach, Tim tries to educate erring drivers without antagonizing them, and at the same time to promote caution by demonstrating to the radio audience how easy it is to unknowingly commit a traffic violation.

Turn Page

Indiana State Trooper McCarthy has tape and does plenty of travelling in his efforts to educate motorists and to prevent traffic accidents like one above.

McCarthy and WGN vice-pres. Ward L. Quaal (left) with Alfred P. Sloan Award which mentioned Signal Ten as imaginatively attacking traffic problems.

Often called in on accident investigation work, McCarthy uses tape recorder to take down statements, as in case of overturned tractor-trailer rig above.

On occasion, a minor traffic offender is let off with a warning and a safe driving lecture, but a serious violator sees the judge. McCarthy uses this approach because drivers have proved to him that being lenient with them doesn't pay off. Even though you may try to talk your way out of a ticket, and perhaps unknowingly provide some good material for Signal Ten, chances are Trooper McCarthy won't be swayed.

The son of a retired city policeman, Tim drives Indiana's highways day and night and gets to know a lot of people in his sector. Indiana State Police troopers are active in all types of police work—from highway patrols to investigations of neighborhood disturbances, major holdups and accidents —and take pride in their reputation as one of America's better law enforcement groups.

The tapes for Signal Ten are made by Tim during the normal course of his duty. Because McCarthy, like other Indiana State Police troopers, is on 24 hour call, his patrol car and tape recorder are issued to him for round-the-clock use. They are always at hand in case needed for a sudden emergency or accident investigation.

Passing the Buck

Many violators recognize Tim when he stops them. Some interviewees are quick to say a lot of the violators appearing on his show are terribly dumb, that they make stupid remarks. Drivers often try to make themselves look good by pointing out to McCarthy the dangerous or foolish behavior of other violators he has interviewed. More than once, those who've done the "bum-rapping" have wound up sounding pretty silly themselves on a Sunday evening. Some drivers complain about other motorists who have committed the same violation as they themselves are being pulled over for.

The alibiing, hedging and even the outright lying, characteristic of certain traffic violators, are familiar to McCarthy. He listens patiently to talkative drivers in the hope that the interview will aid in promoting increased traffic safety consciousness when aired on Signal Ten.

Several Indiana drivers have heard themselves on the show a few weeks after they have been stopped, striving to manufacture an alibi, or trying to turn the interview toward the ineptness of other drivers, and hoping to avoid a ticket. McCarthy views talkative, alibiing violators as "cooperative" because they give him long interviews in which he takes every opportunity to point out the seriousness of their violations and to reason with them in the hope of improving their attitudes. This makes good educational material for the show.

Tim hopes that the dramatization of traffic violations will make listeners more aware of the sort of mistakes they can sometimes carelessly commit. He also aims at giving drivers a better understanding of other drivers and the danger they represent.

In addition to interviews with traffic violators, McCarthy uses his tape recorder at accident scenes to take down statements and to uncover the violations involved. These are also used on Signal Ten. Since Tim is not restricted to traffic activities, he sometimes uses statements of apprehended criminals to give Signal Ten a touch of excitement.

Not long ago, while cruising in his patrol car, McCarthy received word of a supermarket robbery in Michigan City. He immediately headed for the nearest strategic intersection where he noted three suspicious looking men

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PLAN SAFE TRANSPORT OF INJURED

The Technical Committee on Transportation of the Injured of the President's Committee for Traffic Safety met in New York on June 16 to draft recommendations for emergency care to be considered for the revised Action Program. The committee's recommendations covered provision of care at the site and safe transportation to the hospital for those injured in traffic accidents.

Committee members shown in the picture above are: left to right: Ray Ashworth, director, field service, International Association of Chiefs of Police; Thomas J. Berk, safety consultant, health and welfare, Metropolitan Life—consultant to the committee; Dr. James B. Mason, assistant director, American College of Surgeons—co-secretary of the committee; Dr. George M. Wheatley, third vice president, health and welfare, Metropolitan Life—chairman of the committee; Ralph Kuhli, director, public safety department, National Safety Council—secretary of the committee; Maitland H. Bustard, executive director, National Committee on Uniform Traffic Laws and Ordinances; Dr. Paul V. Joliet, chief, accident prevention program, U. S. Public Health Service, and Alfred W. Cantwell, national director, safety services, American National Red Cross.

Other members of the committee, not pictured above, are: Dr. Preston A. Wade, American College of Surgeons—vice chairman of the committee; Dr. Oscar P. Hampton, Jr., Committee on Trauma, American College of Surgeons; Louis R. Morony, director, laws division, Automotive Safety Foundation, and Dr. Franklin D. Yoder, director, division of environmental medicine, American Medical Association.

SAFETY DEVICES AND FEDERAL VEHICLES

Maj. Gen. George C. Stewart, executive vice president of the National Safety Council, made the following statement before the Senate Subcommittee on Surface Transportation of the Committee on Interstate and Foreign Commerce relative to H. R. 1341, the Roberts bill concerning federal safety standards for federally owned or operated vehicles.

* * * *

The National Safety Council was chartered by the Congress to work for the prevention of accidents of all kinds. The Council is qualified and, in the spirit of its Charter, permitted to respond to requests from legislative bodies to testify as to the safety aspects of proposed legislation. It is in this role that I appear before you today as the Council's representative.

Over the years the automobile industry has equipped motor vehicles with many devices which make it easier for a motor vehicle operator to drive safely, or which substantially reduce the potential for injury to vehicle occupants in the event of an accident.

Many of the improvements that make it easier for an operator to drive safely have been welcomed by purchasers and are now standard equipment on many of today's models. Among these are such things as windshield wipers and washers, brake lights, direction signals, back-up lights, windshield and rear window defrosters, power steering, power brakes, and improved headlighting.

On the other hand, certain devices which give protection to occupants of a vehicle in the event of an accident have not been widely accepted by the public and their installation is generally on an optional basis, with added costs. Among these are such things as recessed steering wheels, panel padding, padded sun visors, seat belts, and interlocking type door locks.

The National Safety Council is convinced from the results of tests and from specific experiences that the installation and use of devices designed to reduce the injury potential to occupants in the event of an accident would, if installed and used, reduce traffic injuries to occupants by one-half. The Council therefore is doing all it can to educate the public to the added protection such devices provide. The problem is to inform and convince people that the added expense and perhaps minor inconvenience associated with these devices are well worth while.

It is in this context that the Council believes that the purposes of H. R. 1341 are worthy of favorable consideration by your committee.

The Congress is to be commended for its concern over the human, social and economic losses to the nation which have been and are being incurred as the result of traffic accidents. As the committees investigating this matter have found, there is no easy solution by single cure for this malady which affects our country.

The requirement that federally owned or operated motor vehicles be equipped with all reasonable safety devices will not solve today's traffic accident problem. It would, however, be a contribution to traffic safety. In the judgment of the National Safety Council such a requirement would:

- Substantially reduce the deaths and the severity of injuries in accidents involving government vehicles;
- Cause some reduction in the number of accidents because of the increased safety consciousness which would be created in the operators whose vehicles were provided with these devices;
- Demonstrate to the public the protection afforded by these devices. This in turn would enlarge the demand for their inclusion as standard equipment in yearly models;
- Encourage operators of commercial fleets to install such devices in their vehicles;
- Encourage state and city governments to require them in state and city owned vehicles;
- Encourage manufacturers to continue their research and development programs to design greater safety into their products;
- The government operates the largest fleet of motor vehicles. As a consumer then, its leadership in requiring safety devices will be most influential.

The national government carries on a very substantial accident prevention program among its employes. Every department of the federal government participates. From this and other evidence it is apparent that the government's policy is to provide safe working conditions for its employes.

Among the government's activities is the operation of a vast fleet of motor vehicles. It would seem evident that the provision of the safest possible conditions for those who operate and otherwise ride in government vehicles would be in accord with the government's policies for protecting its employes in other work places. Certainly, experience in industry and government has demonstrated that accidents are reduced when its employes are provided safe places to work and safe equipment to work with.

The purpose the Council seeks is to get people to demand the installation and to use those proven safety devices that reduce the dangers of serious injury in the event they are involved in a traffic accident. The Council believes that leadership on the part of the federal government in recognizing the value of such devices by having them installed in government vehicles will contribute substantially to the Council's purpose, and the Council urges that the government take such leadership.

When hearings on this legislation were held before a Committee of the House, representatives of the automobile industry objected to certain language in the bill, with reference to establishment of standards, although agreeing with the aim of getting available safety equipment used on government owned vehicles.

The National Safety Council takes no position with respect to any differences of opinion that may exist concerning the technical language of the bill. We do believe, however, that the full potential of the bill will be realized only if it has the enthusiastic support of all concerned. To this end the Council hopes that any differences concerning the language of the bill may be settled in a mutually satisfactory manner, so that its essential purpose will have the best possible chance of achievement.

LAUNCH NEW CAMPAIGN AGAINST HOLIDAY ACCIDENTS

IMMEDIATELY following the Fourth of July holiday, state safety coordinators and their associates from eight of 13 Midwest states met with national traffic safety agencies in Chicago to analyze the appalling record toll of 442 lives lost in traffic over the holiday weekend.

The conferees discussed the plans each state had made prior to the tragic holiday, and studied the results attained.

The two big questions considered were: "Did we fail the people looking to us for leadership?" and "What can we do to prevent another such carnage over Labor Day and throughout the year?"

A committee was appointed to study the subject. The committee was composed of Robert A. Campbell, state safety coordinator for Illinois (chairman); J. Grant Keys, director, Ohio department of Highway Safety; Gerald W. Shipman, executive secretary, Michigan State Safety Commission; Lucien C. Bever, director of highway safety, Indiana, and Lt. F. W. Shadwell, director, traffic education section, Missouri State Highway Patrol.

The committee decided that a special study should be made of each of the 125 fatalities which took place in the 13-state area to provide additional information on accident causes, and that this information should be circulated to the 13 states before Labor Day.

They recommended a more detailed reporting of injuries, stating that mere measurement of fatalities was not enough and that more stress should be given to crippling, perhaps permanent, injuries.

The committee cited the apathy of the public and the incompetence of drivers as major factors in the traffic toll and stressed the need for a program to change the public attitude and to upgrade driver performance.

They felt that a campaign must be undertaken to develop greater social pressures on unsafe and illegal drivers so that society would one day look upon such drivers as undesirable, even demanding that they be promptly removed from the highway, either permanently or until such time as they rehabilitate themselves as safe and knowledgeable drivers.

Drafting plans to cut holiday toll are, seated left to right: Edmund L. Moriarty, Illinois; Lou Bever, Indiana; F. W. Shadwell, Missouri; A. Richard Tow, Iowa; Robert A. Campbell (chairman), Illinois; Betty Greenberg, Council of State Governments; John J. Flaherty, National Safety Council; J. Grant Keys and Joseph A. Wolfe, Ohio; Gerald Shipman, Michigan, and Robert A. Matson, Wisconsin. Standing are: Ray Hill, Illinois; Bill Burnett, Iowa; Clarence Hager, Chicago Police Department; P. M. O'Connell, Lake County Safety Commission, Illinois; Ira Rogers, Auto Safety Foundation; Jack Trimble, National Safety Council; Vern Langille, Firestone Tire and Rubber.

Swift action followed the committee's recommendation of a special study. The National Safety Council immediately prepared a questionnaire on Fourth of July accident experience and sent it to the appropriate agencies in each state in the nation which had reported Fourth of July accident experience.

Answers to the questionnaire were returned to the NSC statistical department where they were analyzed. These analyses were then mailed to the states in time to help them with their Labor Day campaigns.

The questionnaire was designed to give as complete a picture as possible of each accident. Among the types of information requested were the following:

Type of car involved in accident (standard, compact, etc.).

Number of continuous hours driver had been at wheel.

Whether accident occurred enroute to vacation spot or on return journey.

Whether driver had any record of previous moving violations.

Awards Announced By Chiefs of Police

The International Association of Chiefs of Police has honored eight states and 66 cities for meritorious work in police traffic supervision in 1959.

Five states and 27 cities were named for outstanding achievement awards and three states and 39 cities for certificates of achievement.

States meriting Outstanding Achievement Awards were: Delaware, North Carolina, Virginia, Washington and California. Those rating Certificates of Achievement were South Carolina, Colorado and Michigan.

Outstanding achievement awards are based on performance evaluations of 90 per cent or higher for states and 85 per cent or higher for cities, as rated in the police traffic supervision section of the Annual Inventory of Traffic Safety Activities.

Certificates of achievement are given on the basis of 85 to 90 per cent performance evaluations for states and 80 to 85 per cent for cities.

PROFILE OF CONGRESS HOST

Next month, Chicago will again play host to safety people from all parts of the world attending the 48th National Safety Congress. And congress delegates, whether glimpsing the hub city of the Midwest for the first time or the 40th, will find much to do between sessions.

Chicago's attractive lakefront skyline, enhanced by miles of beaches, parks, golf courses and boat harbors, is unique. Lake Shore Drive, an eight-lane divided highway for most of its 16.5 miles, winds through this lakefront playground from the far north side to the south side. A bus or automobile trip along this famous drive is a top attraction for many visitors.

Plenty of Variety

The great mercantile and entertainment heart of Chicago is the Loop—the downtown area circumscribed by elevated tracks. Within this square mile are some of the city's finest restaurants, hotels, night clubs, theaters, movie houses, shops and department stores.

The city boasts 200 parks. At Lincoln Park, the largest, visitors will find a golf course, a zoo and a conservatory.

Grant Park, lying along the lake just opposite the Congress Hotel—in which traffic delegates to the safety congress are housed—contains many miles of walks and artistically landscaped areas. The Buckingham Memorial Fountain, at the foot of Congress Street, is surrounded by formal gardens.

Chicago's museums are famous throughout the world.

Contemporary and traditional paintings, drawings, and sculpture are among the art works displayed at the Art Institute. Special shows always are in evidence and the art museum also has a drama school and theater where student productions are presented during the fall and winter season.

The Museum of Science and Industry, in Jackson Park, contains unusual exhibits of applied science, engineering, and industry. A top attraction here is a full-sized operating coal mine; visitors are lowered into the shaft to see the actual operation. A German submarine, captured during World War II, also may be inspected at the museum.

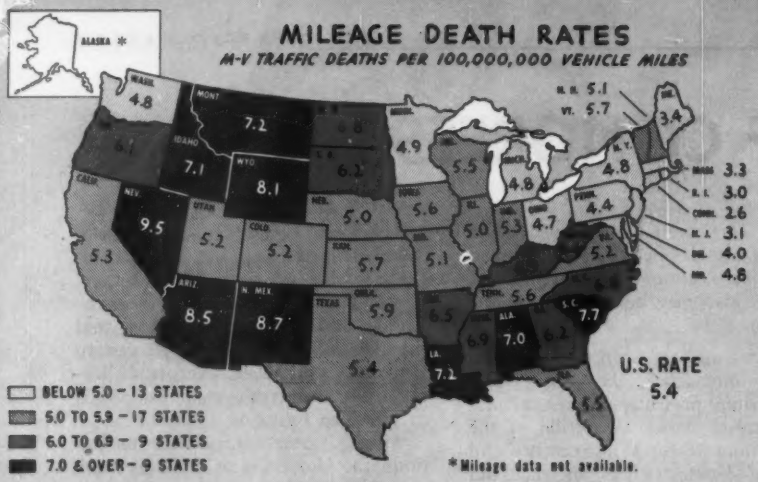
Located on an artificial peninsula jutting into the lake, the Adler Planetarium presents educational and astronomical shows. A section of the planetarium features instruments and models demonstrating ancient and modern astronomical methods.

Exhibits at the John G. Shedd Aquarium, at the southern end of Grant Park, include about 10,000 living specimens of 250 aquatic species. Nearby is the Natural History Museum, noted for its fine exhibits in natural sciences. The "Races of Mankind" exhibits, Hall of the Stone Age, and exhibits of animals and birds in their natural habitats are famous features at the museum.

There are several prominent educational institutions in Chicago, including the University of Chicago, Loyola University, DePaul University, Illinois Institute of Technology, and the medical schools of Northwestern University and the University of Illinois. Northwestern's main campus is in suburban Evanston.

Among great educational institutions, the University of Chicago ranks near the top. The campus is located on the south side and the buildings are outstanding examples of Gothic architecture. The university's Institute for Basic Research played a prominent role in the war-time development of the atomic bomb.

The Chicago Board of Trade, tallest building in the city, houses the world's largest grain exchange. Visitors may watch the colorful trading operations conducted daily. The observation floor offers a fine view of the city.



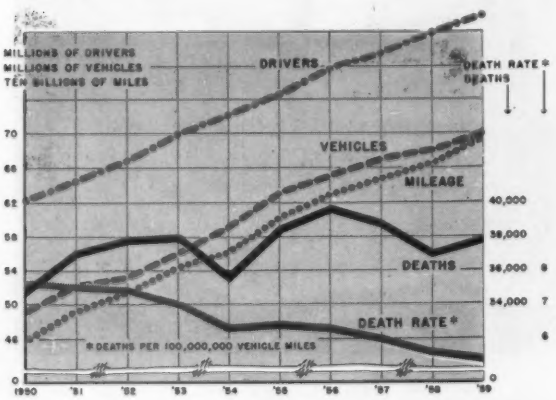
TRAFFIC ACCIDENT FACTS 1960

Here's a digest of the most used and the most sought after traffic accident statistics taken from the latest edition of *Accident Facts*.

Ten-year summary, 1950-1959

Deaths	**375,000**
Injuries (Disabling beyond the day of accident)	**13,500,000**
Motor-vehicle Mileage	**580,000,000,000**
Costs	**$45,000,000,000**

- During the 1950's, drivers, vehicles, and mileage continued their sharply rising trends, as follows: drivers +42 per cent, vehicles +57 per cent, mileage +68 per cent.
- Deaths moved irregularly higher, but the overall increase of 19 per cent was only about one-third that for vehicles and mileage. In three of the years, deaths decreased.
- The mileage death rate decreased 28 per cent, reaching the lowest level on record in 1959.
- Accidents during the ten-year period are estimated at 100,000,000, in which about 13,500,000 persons suffered disabling injuries. Probably twice this many suffered minor injuries.
- The economic loss from all these accidents was at least $45,000,000,000.



MOTOR-VEHICLE ACCIDENTS, 1959

Deaths	**37,800**
Injuries (Disabling beyond the day of accident)	**1,400,000***
Motor-vehicle Mileage	**695,000,000,000**
Costs	**$6,200,000,000**

*Disabling motor-vehicle injuries are not reported on a national basis. The total shown is an approximation based on a ratio of disabling injuries to deaths developed from special studies. The total is the best estimate for the current year; however, it should not be compared with totals shown in previous editions of ACCIDENT FACTS to indicate either year-to-year changes or trends.

Death rate (per 100,000,000 miles of travel)	**5.4**
Registered vehicles in the U. S.	**70,400,000**
Licensed drivers in the U. S.	**84,000,000**

Accident totals

Severity of Accident	Number of Accidents	Drivers Involved
Fatal	**32,300**	**46,000**
Nonfatal injury	**900,000**	**1,600,000**
Property damage	**9,300,000**	**16,400,000**
Total (rounded)	**10,200,000**	**18,000,000**

How the persons were killed

		Deaths	Change from 1958
All motor-vehicle accidents		**37,800**	**+2%**
Includes deaths involving mechanically or electrically powered highway-transport vehicles in motion (except those on rails), both on and off the highway or street.	Urban	10,000	+3%
	Rural	27,800	+2%
Pedestrian accidents		**7,750**	**+1%**
Includes all deaths of persons struck by motor vehicles, either on or off a street or highway, regardless of the circumstances of the accident.	Urban	4,850	+1%
	Rural	2,900	+2%

Collisions between motor vehicles ..... 15,100 +6%

Includes deaths from collisions of two or more motor vehicles. Motorized bicycles and scooters, trolley buses, and farm tractors or road machinery travelling on highways are motor vehicles.

Urban	2,500	+16%
Rural	12,600	+ 5%

Noncollision in roadway, overturning, running off roadway ... 11,600 0%

Includes deaths in all types of noncollision accidents. Classification is according to first event. If car runs off roadway and then strikes fixed object, death is charged as noncollision accident.

Urban	1,350	0%
Rural	10,250	0%

Collisions with railroad trains .. 1,135 —14%

Includes deaths from collisions of motor vehicles (moving or stalled) and railroad vehicles at public or private grade crossings. In other types of accidents, classification requires motor vehicle to be in motion.

Urban	435	—16%
Rural	700	—13%

Collisions with bicycles ..... 480 + 7%

Includes deaths of bicyclists and motor-vehicle occupants from collisions between bicycles and motor-vehicles on streets, highways, private driveways, parking lots, etc.

Urban	210	+5%
Rural	270	+8%

Collisions with fixed objects 1,650 0%

Includes deaths from collisions with fixed objects such as trees, walls and abutments, where the collision occurred while the vehicle was still on the highway. (See comment on noncollision.)

Urban	650	0%
Rural	1,000	0%

Other collisions ..... 85 — 5%
(street cars, animals, animal-drawn vehicles)

Includes deaths from motor-vehicle collisions not specified in other categories above. Accidents resulting in 80 of the deaths involved animals or animal-drawn vehicles. Five deaths arose out of accidents with street cars. This latter total is the lowest on record, reflecting a continuing decrease in the number of street cars.

Day-night mileage death rates

Night driving is considerably more hazardous than day driving, in both urban and rural areas. Rates in the chart below are only approximations of the 1959 experience because distribution of vehicle miles into the various categories is based on scanty information, but even though the rates may not be precise, the great differences between the day and night rates leave no doubt that night driving is more hazardous than day driving.

		Per Cent of Deaths	Death Rates*
NATIONAL	Day	46%	4
	Night	54%	10
URBAN	Day	41%	3
	Night	59%	6
RURAL	Day	48%	5
	Night	52%	13

*Deaths per 100,000,000 vehicle miles.

Mileage Death Rates on Turnpikes and Rural Roads

Turnpike	Deaths per 100,000,000 Vehicle Miles				
	Turnpike				State Rural Roads
	1956	1957	1958	1959	1959*
All Turnpikes	3.0	2.6	2.8	2.8	7.4
Denver-Boulder Turnpike (Colo.)	—	2.9	.0	7.2	6.6
Connecticut Turnpike	—	—	1.5	1.4	3.6
Sunshine State Parkway (Fla.)	—	2.5	4.1	2.6	8.5
Illinois Tollway	—	—	4.6	0.5	8.9
Indiana East-West Toll Road	5.3	2.6	4.6	4.5	7.4
Kansas Turnpike	2.8	5.9	8.1	5.5	6.9
Kentucky Turnpike	—	—	6.0	.0	8.8
Maine Turnpike and Extension	4.3	2.1	1.6	5.1	3.3
Massachusetts Turnpike	—	3.3	3.2	2.9	3.3†
New Hampshire Turnpikes	.0	.0	3.4	4.1	5.0
Garden State Parkway (N. Jersey)	1.3	1.3	1.0	2.1	3.2†
New Jersey Turnpike	2.3	2.0	2.4	1.5	3.2†
New York State Thruway	2.7	1.9	0.9	2.8	5.4
Ohio Turnpike	1.9	3.1	3.2	1.8	7.4
Will Rogers and Turner Turnpikes (Okla.)	2.8	3.4	9.1	6.1	6.8
Pennsylvania Turnpike	4.6	3.3	4.1	3.7	4.2
Richmond-Petersburg Turnpike (Va.)	—	—	.0	0.7	6.8
Dallas-Ft. Worth Turnpike (Tex.)	—	.0	4.1	2.1	7.9
West Virginia Turnpike	8.5	14.0	8.0	13.5	8.5

Source: American Bridge, Tunnel and Turnpike Assn.
*State rates exclude turnpike experience (NSC estimates). †State-wide, excluding turnpike.

Motor-Vehicle Deaths on Major Holidays

The table (right) shows the number of deaths which resulted from motor-vehicle accidents on major holidays in recent years. "Immediate" deaths include only those which occurred by midnight of the last day of the holiday period. "Total" deaths include immediate deaths plus an estimate of delayed deaths—those which occur within twelve months after the day of accident (they are charged back to the day of the accident).

Year	Memorial Day		Fourth of July		Labor Day		Christmas		New Year	
	Immediate Deaths	Total Deaths	Immediate Deaths	Total Deaths	Immediate Deaths	Total Deaths	Immediate Deaths	Total Deaths	Immediate Deaths	Total Deaths
1951	81 (1)*	125	105 (1)	160	461 (3)	615	535 (4)	670	375 (4)	470
1952	363 (3)	485	366 (3)	490	432 (3)	575	556 (4)	695	407 (4)	510
1953	241 (2)	345	261 (2)	375	405 (3)	540	523 (3)	695	317 (3)	420
1954	362 (3)	485	348 (3)	465	364 (3)	485	392 (2)	560	296 (2)	425
1955	368 (3)	490	407 (3)	540	438 (3)	585	609 (3)	810	364 (3)	485
1956	109 (1)	170	137 (1)	210	435 (3)	580	706 (4)	885	409 (4)	510
1957	94 (1)	145	426 (4)	535	445 (3)	595	224 (1)	345	160 (1)	245
1958	371 (3)	495	370 (3)	495	420 (3)	560	594 (4)	740	377 (4)	470
1959	310 (2)	445	276 (2)	395	438 (3)	585	493 (3)	660	374 (3)	500

Source: "Immediate" deaths, Press Association; "Total" deaths, NSC estimates.
*Figures in parentheses show number of full days in each holiday period. Deaths are for these days plus the last six hours of the preceding day.

Violations of Motor Scooter Operators in Fatal Accidents

Between 100 and 125 persons are killed and another 4,000 to 5,000 injured annually in motor scooter accidents. Most of these persons are operators of scooters. One-third of the victims are under 16 years; about three-fourths are under 25. Among the victims under 16 years, three out of four accidents occur in rural areas; for those over 16 years, accidents are about equally divided between urban and rural areas. A special study showed operators violating in 7 out of 10 accidents. The principal violations were:

Violation of Motor Scooter Operator	Total Violations	Movement of M.V.		No other Mot. Veh. Involved	Not Stated
		Straight	Turning		
Total	63	39	5	17	2
Did not have right-of-way	13	7	1	5	
Excessive speed	11	4		6	1
Improper turning	8	8			
Disregarded signs, signals	5	4	1		
Wrong side of road, not passing	4	3		1	
Failure to signal/improper signal	4	4			
Improper passing	2	1	1		
Following too closely	2	1	1		
Other violations	14	7	1	5	1

Source: National Safety Council Study.

No one can say exactly how many motor-vehicle accidents are due to a particular circumstance, because most accidents have a combination of several circumstances, and few accidents are investigated carefully enough to determine exactly what the underlying causes were. The following paragraphs summarize the more important contributing circumstances as reported on 1959 state summaries.

Alcohol

Drinking among drivers and pedestrians is a major factor in motor-vehicle accidents, according to reports from city and state traffic authorities. Condition of drivers and pedestrians has been shown under two schedules in the reporting forms: one giving the number of persons "under the influence" of alcohol, the other, the number who "had been drinking"—any amount. The figures below are based on this latter schedule for 1959.

- **One out of every five drivers involved in a fatal motor-vehicle accident had been drinking.**

- **Nearly one out of every three fatal motor-vehicle accidents involved a drinking driver.**

  - *About 10,000 of the 32,000 fatal motor-vehicle accidents in 1959 involved a drinking driver.*

- **One out of every four adult pedestrians killed in a motor-vehicle accident had been drinking.**

  - *About 1,500 of the 5,700 adult pedestrians killed in 1959 had been drinking.*

City and state reports on alcohol factor in fatal accidents

The summary figures above are believed to indicate minimum conditions because of the difficulty of getting complete and accurate reports. Special studies probably reflect the problem quite accurately in the area of study, and may even be more representative of the national experience than the figures above. Highlights of several of these studies are shown below.

Delaware. Among 65 fatal accidents which occurred in 1958, 48 per cent involved a drinking driver. Among all the drivers in these accidents, 38 per cent had been drinking.

Maryland. Among 130 drivers in fatal accidents in this state, 67 per cent had some alcohol in their blood; 40 per cent had 0.15 per cent or more. Among 71 fatal pedestrian accidents, the respective figures for the pedestrians were 56 per cent and 33 per cent.

Minnesota. Severity of accidents increased in proportion to the incidence of drinking drivers involved: 43 per cent more drinking drivers were involved in nonfatal accidents and 213 per cent more were involved in fatal accidents than in property damage accidents. (Special 1958 study covering 69,289 drivers.)

Texas. The Texas Department of Public Safety reported that in all fatal rural

Selected Circumstances Contributing to Accidents, 1959

Circumstance	Fatal Accidents		Injury Accidents		All Accidents*	
	Statewide	Urban	Statewide	Urban	Statewide	Urban
Total Circumstances Recorded	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Improper Driving	**90.3**	**81.2**	**91.6**	**86.1**	**92.4**	**89.5**
Speed too fast	31.0	26.6	17.4	13.0	13.0	10.2
Drove left of center	15.8	4.4	7.4	2.8	7.6	3.0
Failed to yield right of way	12.4	21.0	20.7	22.3	18.7	19.4
Passed stop sign	5.2	3.6	5.8	3.7	4.6	2.9
Improper overtaking	4.4	1.2	3.5	1.7	5.2	3.9
Disregarded traffic signal	3.6	5.2	4.4	6.0	2.8	4.4
Made improper turn	1.6	2.0	3.5	3.3	5.7	5.9
Followed too closely	1.2	1.1	13.5	14.3	13.6	15.2
Other improper driving	15.1	16.1	15.4	19.0	21.2	24.6
Had been Drinking	**8.3**	**16.1**	**5.7**	**9.5**	**5.2**	**7.7**
Brakes and Lights	**1.4**	**2.7**	**2.7**	**4.4**	**2.4**	**2.8**
Inadequate brakes	1.1	1.7	2.4	2.2	2.1	2.1
Improper lights	0.3	1.0	0.3	2.2	0.3	0.7

Source: City and state traffic authorities.
*Principally property damage accidents, but also includes fatal and injury accidents.

Approximate speed at time of accident

The table below shows the distribution by reported speed of vehicles involved in fatal accidents, and all accidents in 1959. Care is needed in interpreting the figures because of the smallness of the sample, and because of difficulty in getting specific and unbiased information.

Speed (mph.)	Fatal Accidents						All Accidents					
	Statewide		Urban		Rural		Statewide		Urban		Rural	
	%	Cum. %	%	Cum. %	%	Cum. %	%	Cum. %	%	Cum. %	%	Cum. %
Standing	2		3		2		13		15		8	
1-10	6	8	10	13	5	7	18	31	23	38	13	21
11-20	8	16	14	27	5	12	22	53	27	65	12	33
21-30	13	29	27	54	7	19	19	72	23	88	13	46
31-40	16	45	19	73	15	34	12	84	9	97	16	62
41-50	20	65	12	85	22	56	8	92	2	99	17	79
51-60	17	82	7	92	21	77	5	97	1	100	12	91
61-70	8	90	4	96	10	87	2	99	*	100	4	95
71 & over	10	100	4	100	13	100	1	100	*	100	5	100

Source: Based on state reports as follows: Statewide—13, Urban—11, Rural—13.
*Less than half of 1 per cent.

Risk of fatal injury in ejections

Persons ejected from accident vehicles are five times more likely to be injured fatally than those who are not ejected, according to a study made by Automotive Crash Injury Research at Cornell University. None of the victims in the study were wearing seat belts. Other studies of persons not ejected indicate that users of seat belts have 60 per cent less chance of injury than non-users of belts.

	Total Persons Injured	Fatally Injured	Not Fatally Injured	Percent Fatally Injured
Ejected	997	121	876	12.1
Not Ejected	5,990	147	5,843	2.5
Total	6,987	268	6,719	3.8

Source: Automotive Crash Injury Research, Cornell University.

Motor-Vehicle Deaths by Days and Months, 1959

Day	1959 Deaths by Day		Total Deaths by Month and Average Deaths by Day											
	%	Ave.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Total	**100%**	**37,800**	**2,790**	**2,430**	**2,860**	**2,650**	**3,110**	**3,260**	**3,250**	**3,510**	**3,360**	**3,440**	**3,490**	**3,650**
Daily Ave.		**103**	**93**	**87**	**95**	**90**	**103**	**111**	**108**	**117**	**114**	**114**	**119**	**121**
Monday	12%	87	78	73	80	76	87	93	91	98	96	96	100	102
Tuesday	11%	80	71	67	73	69	80	85	83	90	88	88	91	93
Wednesday	11%	80	71	67	73	69	80	85	83	90	88	88	91	93
Thursday	13%	95	84	79	86	82	94	101	98	106	104	104	108	110
Friday	15%	109	97	91	100	95	108	116	113	122	120	120	125	127
Saturday	21%	153	136	128	140	133	152	163	159	171	168	168	175	178
Sunday	17%	124	110	103	113	107	123	132	129	139	136	136	141	144

Source: Based on reports from 30 state traffic authorities.

Types of Motor Vehicles Involved in Accidents, 1959

Type of Vehicle	In Fatal Accidents		In All Accidents		Percentage of Total Vehicle Registrations
	Number	Percentage	Number	Percentage	
All Types	**46,000**	**100%**	**18,000,000**	**100%**	**100%**
Passenger cars	36,300	79	15,500,000	86	83
Taxis	200	*	150,000	1	
Trucks	8,100	18	2,000,000	11	16
Buses	400	1	150,000	1	*
Motorcycles	600	1	100,000	*	1
Other†	400	1	100,000	*	*

Source: Based on reports from 23 state traffic authorities. Vehicle registrations from U. S. Bureau of Public Roads.
†Types of vehicles classified as "Other" consist of motor scooters, motorized bicycles, fire equipment, ambulances, etc.
*Less than half of 1 per cent.

accidents in 1959, 45 per cent involved a drinking driver. Among all the drivers in these accidents, 30 per cent had been drinking.

Speed

"Speed too fast" was a contributing factor in 31 per cent of all fatal accidents and in nearly 27 per cent of urban fatal accidents in 1959.

In nonfatal accidents, speed too fast was a contributing factor in smaller percentages of accidents, as follows: injury accidents: statewide—17 per cent, urban—13 per cent; property damage accidents: statewide—13 per cent, urban—10 per cent.

These facts were summarized from new reports available for the first time in 1959.

Improper driving

Improper driving is a contributing circumstance in most motor-vehicle accidents. In fatal accidents, speed is the principal circumstance; in injury and property damage accidents, failure to yield right of way is the principal circumstance. These facts, and the others shown in the table below, were tabulated from new accident summary forms which were being used for the first time in 1959 by both city and state motor-vehicle departments.

Driver violations are no longer a part of the standard reporting procedure, having been replaced by contributing circumstances. The former procedure indicated that many accidents did not involve a driver violation. Every accident, though, arises out of one or more circumstances. Traffic experts believe, therefore, that more complete and useful information will be revealed by the new classification.

In the table, the experience is shown separately for urban and statewide. Because 1959 was an optional year for switching to the new forms, there was not sufficient reporting on the new basis to give reliability to separate rural figures, but it is expected that such information will be available in future years. The statewide figures shown in the table include both urban and rural experience.

Failure to yield right of way, a principal circumstance in accidents

Injury accidents, both in urban areas and statewide, arise principally from failure to yield right of way. In urban areas, following too closely is second and speed is third, while statewide, speed is second and following too closely is third.

Had been drinking is more important in urban areas, and is more often a circumstance in fatal accidents than in either injury or property damage accidents. The figures in the table include only those "had been drinking" accidents in which it was definitely established that drinking was a contributing circumstance. These figures differ from those discussed in the section on alcohol which are based on the previous summary form, and show the total number of accidents involving a drinking driver with no attempt to determine the extent to which such drinking contributed to the accident.

Motor-Vehicle Death Rates and Costs, 1913 to 1959

Year	No of Deaths	No. of Vehicles (millions)	Vehicle Miles (billions)	No. of Drivers (millions)	Death Rates: Per 10,000 Motor Vehicles	Death Rates: Per 100,000,000 Vehicle Miles	Death Rates: Per 100,000 Population	Costs ($ million)*
1913-17 ave.	6,800	2.9	†	4.0	23.8	†	6.8	**
1918-22 ave.	12,700	9.2	†	14.0	13.9	†	11.9	**
1923-27 ave.	21,800	19.7	120	29.0	11.1	18.2	18.8	**
1928-32 ave.	31,050	25.7	199	38.0	12.1	15.6	25.3	1,300
1933	31,363	24.2	201	35.0	13.0	15.6	25.0	1,350
1934	36,101	25.3	216	37.0	14.3	16.7	28.6	1,550
1935	36,369	26.5	229	39.0	13.7	15.9	28.6	1,550
1936	38,089	28.5	252	42.0	13.4	15.1	29.7	1,650
1937	39,643	30.1	270	44.0	13.2	14.7	30.8	1,800
1938	32,582	29.8	271	44.0	10.9	12.0	25.1	1,500
1939	32,386	31.0	285	46.0	10.4	11.3	24.7	1,500
1940	34,501	32.4	302	48.0	10.6	11.4	26.1	1,600
1941	39,969	34.9	334	52.0	11.5	12.0	30.0	1,900
1942	28,309	33.0	267	49.0	8.6	10.6	21.2	1,600
1943	23,823	30.9	206	46.0	7.7	11.5	17.8	1,250
1944	24,282	30.5	212	45.0	8.0	11.5	18.3	1,250
1945	28,076	31.0	249	46.0	9.1	11.3	21.2	1,450
1946	33,411	34.4	341	50.0	9.7	9.8	23.9	2,200
1947	32,697	37.8	370	53.0	8.7	8.8	22.8	2,650
1948	32,259	41.1	398	55.0	7.8	8.1	22.1	2,800
1949	31,701	44.7	424	59.3	7.1	7.5	21.3	3,050
1950	34,763	49.2	458	62.2	7.1	7.6	23.0	3,100
1951	36,996	51.9	491	64.4	7.1	7.5	24.1	3,400
1952	37,794	53.3	514	66.8	7.1	7.4	24.3	3,750
1953	37,955	56.3	544	69.9	6.7	7.0	24.0	4,300
1954	35,586	58.6	561	72.2	6.1	6.3	22.1	4,400
1955	38,426	62.7	603	74.7	6.1	6.4	23.4	4,500
1956	39,628	65.2	628	77.9	6.1	6.3	23.7	5,000
1957	38,702	67.1	647	79.6	5.8	6.0	22.7	5,300
1958	36,981	68.3	665	81.5	5.4	5.6	21.3	5,600
1959	37,800	70.4	695	84.0	5.4	5.4	21.4	6,200

Source: Death totals from National Office of Vital Statistics except 1959 which is N.S.C. estimate based on data from state traffic authorities. Motor-vehicle registrations, mileage and drivers from U. S. Bureau of Public Roads. Costs are N.S.C. estimates.

*Cost figures are not completely comparable through all years. As additional or more precise cost data have become available through the years, they have been used in developing cost estimates from that year forward, but previously estimated figures were not revised.

**Data insufficient for estimating costs.

†Mileage data inadequate prior to 1923.

Age of Driver

There are about 84,000,000 licensed drivers in the U.S. The numbers of these drivers in different age groups are shown in the following table, along with their accident experience for 1959. The Accident Indexes provide a measure of performance; see footnote for definition.

Age Group	All Drivers: Number	All Drivers: %	Drivers in Accidents: Fatal: Number	Drivers in Accidents: Fatal: %	Drivers in Accidents: All: Number	Drivers in Accidents: All: %	Accident Index*: Fatal	Accident Index*: All
Total	**84,000,000**	**100.0%**	**46,000**	**100.0%**	**18,000,000**	**100.0%**	**1.00**	**1.00**
Under 20	6,000,000	7.2	5,350	11.6	2,340,000	13.0	1.61	1.81
20-24	9,400,000	11.2	7,700	16.8	2,700,000	15.0	1.50	1.34
25-29	10,700,000	12.7	6,150	13.4	2,540,000	14.1	1.06	1.11
30-34	10,500,000	12.5	5,300	11.5	2,020,000	11.2	.92	.90
35-39	9,700,000	11.6	4,200	9.1	1,840,000	10.2	.78	.88
40-44	8,700,000	10.3	4,100	8.9	1,620,000	9.0	.86	.87
45-49	7,600,000	9.1	3,600	7.8	1,450,000	8.1	.86	.89
50-54	6,600,000	7.8	2,700	5.9	1,120,000	6.2	.76	.79
55-59	5,200,000	6.2	2,100	4.6	860,000	4.8	.74	.77
60-64	3,900,000	4.7	1,800	3.9	610,000	3.4	.83	.72
65-69	2,600,000	3.1	1,350	2.9	540,000	3.0	.94	.97
70-74	1,800,000	2.1	950	2.1	200,000	1.1	1.00	.52
75 and over	1,300,000	1.5	700	1.5	160,000	.9	1.00	.60

Source: Drivers in accidents based on reports from 25 state traffic authorities. Number of drivers by age are N.S.C. estimates based on reports from state traffic authorities and research groups.

*Ratio of per cent of accidents to per cent of drivers. 1.00 is average; the larger the ratio, the poorer the experience. Ratios are based on *numbers of drivers;* a better measure would relate accidents to miles driven, but data on this item are not available.

Sex of Driver

In 1959, there were about 59,000,000 male drivers and 25,000,000 female drivers. **Related to the number of drivers** of each sex, males have a sharply higher involvement rate than females, although the rates for males have been improving, while the rates for females have been getting worse. (See table below.) **Related to the miles driven*** by each sex, females have higher accident rates than males. (Not shown in table.)

Year	Fatal Accidents: Male: No.	Fatal Accidents: Male: Rate‡	Fatal Accidents: Female: No.	Fatal Accidents: Female: Rate‡	All Accidents: Male: No.	All Accidents: Male: Rate†	All Accidents: Female: No.	All Accidents: Female: Rate†
1952	41,500	88	3,800	20	15,850,000	337	2,150,000	113
1953	41,700	87	4,100	21	14,100,000	294	2,200,000	110
1954	39,100	77	3,900	19	13,500,000	265	2,200,000	105
1955	41,500	77	4,800	22	14,500,000	268	2,500,000	114
1956	42,500	77	4,900	22	14,900,000	270	2,800,000	127
1957	41,300	72	5,200	23	14,900,000	261	3,100,000	135
1958	38,800	67	5,200	22	14,400,000	248	3,200,000	133
1959	40,400	68	5,600	22	14,400,000	244	3,600,000	144

Source: Based on reports from state traffic authorities.

‡Number of drivers in fatal accidents per 100,000 drivers.

†Number of drivers in all accidents per 1,000 drivers.

*Estimated.

Discussing merits of movie, "Stop Driving Us Crazy," are (L to R): Don Mann. Phil Garrison, Don Brown and Georgia Hutchins.

TV PANEL PROMOTES FILM

A time-tested formula for putting an idea across is: First of all, tell your audience what you're *going* to tell them . . . then *tell* it to them . . . finally, tell them what you've *told* them.

The Springfield-Greene County Safety Council (Mo.) took this approach in popularizing the new safe driving film, "Stop Driving Us Crazy."

Instead of merely presenting the picture on "Television Classroom," a public service program of Station KTTS-TV, they gave the movie's message a recall assist by following up the presentation with a panel discussion by three teen-agers.

While the film is not written especially for a young audience, the treatment and musical background make it attractive to the youthful viewer.

Don Brown, manager of the safety council, working with officials of the TV station and members of the Television, Radio and Film Commission of the Methodist Church (producers of the film), arranged the show.

He received permission from local high school authorities to invite one student from each of the three public high schools to participate in the panel. All participants had completed the driving training course which is a requirement of the public schools.

The young people chosen were Don Mann, Hillcrest High School; Phil Garrison, Parkview High School, and Georgia Hutchins, Central High School.

The students met with Brown, who moderated the panel, several times prior to the TV presentation to view the film. Although the panel discussion was completely unrehearsed, it was felt that the students should have a good knowledge of the film to enable them to develop general topics of discussion. They decided that the major line to pursue was the importance of proper driving attitudes. They centered their 19 minute discussion on this point.

The presentation was a complete success.

Brown feels that teenagers strike the right note in discussing this film. "They don't over-moralize the problem," he says, "and they have none of the pedantic attitudes that many professional traffic safety people possess."

Truckers Speak

Mack Trucks, Inc., is using the actual voices of the trucking industry's drivers and operators in a nationwide radio series citing the industry's contribution to America's economy and highway safety.

The coast-to-coast radio series is featured for the fifth consecutive year on Monitor, NBC's popular weekend show. It will be heard Friday, Saturday and Sunday through September 4, over a network of some 185 stations.

School Bus Survey

This quarter's *Research Review* features a study released by the Illinois Division of Highways' bureau of traffic, which deals with the severity of school bus accidents in that state. (See Page 26 of the *Review*.)

The study is essentially an analysis of Illinois motor vehicle accidents involving school buses which occurred outside metropolitan Chicago during 1958.

Investigators recommend greater care in the recruitment of school bus operators. They also urge, where needed, supplemental training for operators.

It was found that the number injured in school bus accidents varies significantly on different types of streets and roads. More pupils received injuries per injury accident occurring on county and local roads than on either state numbered routes or municipal streets.

Also noteworthy was the discovery that violations found to be significantly related to many injury accidents, had often been committed by those same operators prior to their involvement in the accidents studied.

The objective of the project, which was based on the accident record files of the Illinois Division of Highways for 1958, was to discover ways in which school bus operators can improve their driving performance.

New Highway Study

The Automotive Safety Foundation will direct a study of the effects of traffic control measures and roadway design on traffic accidents under a contract with the Bureau of Public Roads.

Ultimate aim of this research is to reduce traffic accidents by giving highway and traffic engineers data on the safest types of roadway design and traffic control measures.

Costs of the study, which is scheduled to be completed by the end of this year, will be shared jointly by the two organizations.

BOOSTER MATERIALS

ORDERS FOR NEW POSTERS SHOWN CANNOT BE SHIPPED UNTIL AFTER NOVEMBER 1

Civic Enthusiasm Materials

Intelligent legislation is a valid way to solve modern traffic problems. Solid civic backing is a prime requirement and can be instrumental in sparking useful lawmaking. Materials listed below can help your staff or community to form an effective program to deal with traffic problems. One might be remedial training for licensed drivers.

Drafting State Traffic Legislation (329.01-43), **Driver Improvement Schools** (329.01-89)—A pair of Traffic Safety Memos, comprehensive discussions prepared by leading traffic authorities. Memos are revised periodically to provide latest information available. Prices of individual memos are based on number of pages. 329.01-43, each: 1—$.30; 2—$.22; 10—$.15. 329.01-89, each: 1—$.80; 2—$.60; 10—$.41.

Public Education for Traffic Safety—A valuable booklet to have when outlining procedures to follow in planning a community safety education program. 42 pages, 6"x9". 329.41. Each: 1—$.75; 10—$.60; 100—$.50.

Be Your Own Traffic Judge—A booklet consisting of traffic accident case histories. Questions readers about each accident. Answers given. While intended for professionals, booklet is valuable to all drivers in preventing accidents. 16 pages with cartoon illustrations. 2 colors, 5¼"x8¾". 294.07. Each: Min. order 50—$.12; 500—$.11; 1000—$.099; 5000—$.094.

Traffic Safety Leaflets—prepared by NSC and American Association of Motor Vehicle Administrators, deal with important aspects of traffic safety. *Safe Drivers Through Licensing* (329.17); How driver licensing can improve the quality of drivers in your state, and how to get a better licensing program. *Toward Court Improvement* (329.18); What the traffic court can and should be doing in handling violations. Packages of 100 (either selection): 1—$2.90; 10—$2.50; 50—$2.30; 100—$2.20; 200—$2.10.

Traffic Safety Reprints (Fact Sheets)—short, specific information on the following topics:

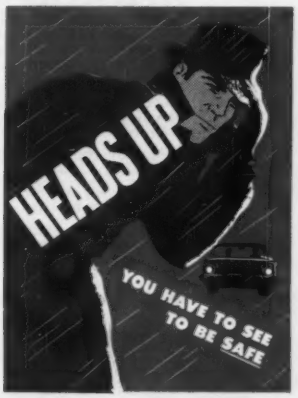
329.96-3 Driver Improvement Schools
329.96-4 Traffic Law Uniformity
329.96-10 Vote For Driver Education
329.96-15 Traffic Courts on Trial

Order fact sheets by title and stock no., e.g. **Use of Turn Signals** (329.96-5).

Traffic Safety Reprint prices: minimum order 50, each: 50—$.05; 500—$.035; 1,000—$.028; 5,000—$.025; 10,000—$.02.

NEW TRAFFIC POSTERS FOR DECEMBER POSTING

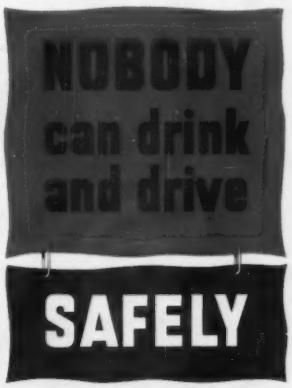
T-2015-C 25x38
T-2016-A 8½x11½



T-2017-B 17x23

ALTERNATE POSTERS FOR DECEMBER POSTING

(These posters may be ordered for immediate delivery)



T-1721-C 25x38
T-1722-A 8½x11½

T-1693-B 17x23

PRICES FOR ABOVE POSTERS

Traffic Posters—T-prefix to number

	1-9	10-99	100-999	1000-4999*
A Size	$0.17	$0.12	$0.07	$0.06
B Size	.30	.20	.165	.132
C Size	.40	.30	.24	.22

YOUR CREDIT LINE can be imprinted at time of the press run on Traffic B and C posters only. Orders for imprints on December posters above must be received by October 10, 1960.

Imprinting charges for these posters are $2.25 per lot plus an initial charge for each electroplate of $21.00 for C poster imprint and $12.50 for B poster imprint.

*Write for prices on quantities of 5,000 or more for special rates on annual poster orders.

PRICES SHOWN ARE SUBJECT TO A DISCOUNT OF 10% TO NATIONAL SAFETY COUNCIL MEMBERS

FLEET POSTERS

POSTER PRICES

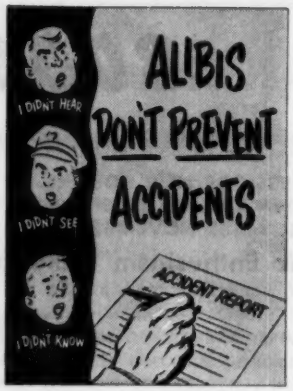
Posters illustrated on these pages are included in the automatic Motor Transportation poster services. Automatic poster sets are available on yearly subscription that provides (4) subjects per month viz. (2) "A" size (8½"x11½") and (2) "B" size (17"x23"). Automatic service is provided in the following categories:

City Truck	City Bus	Annual price 1-4 sets, $9.90; 5-49, $7.80; 50 or more, $6.44.
Intercity Truck	Intercity Bus	
Sales Truck	Taxicab	
Truck Terminal	Bus Terminal	

Posters are available for individual selection at the following prices:

	1-9	10-99	100-999	1000-4999*
A size, any selection	.17	.12	.07	.06
B size, any selection	.32	.23	.195	.155

All prices shown are subject to a 10% discount to National Safety Council Members. *Write for prices on quantities of 5,000 or more. See page 29 for prices of posters with T-prefix.



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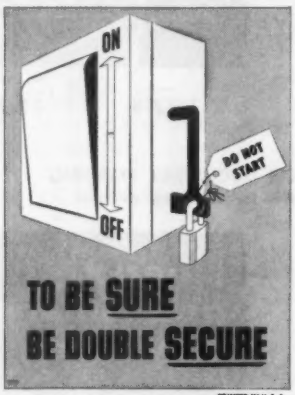
V-1978-B 17x23



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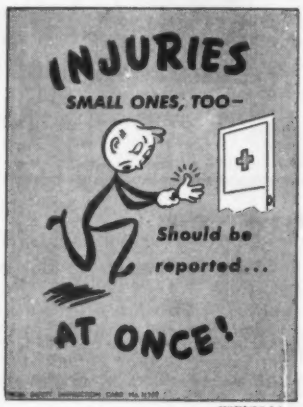
1956-A 8½x11½

NATIONAL SAFETY COUNCIL

0519-A 8½x11½

NATIONAL SAFETY COUNCIL

0585-B 17x23



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8809-A 8½x11½

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1398-B 17x23

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1620-A 8½x11½

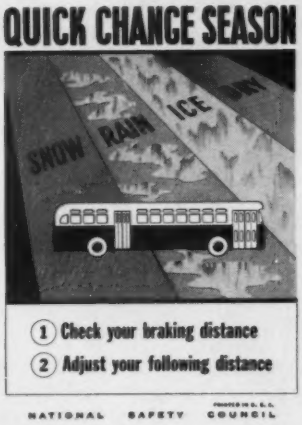
V-1979-B 17x23

V-1977-A 8½x11½

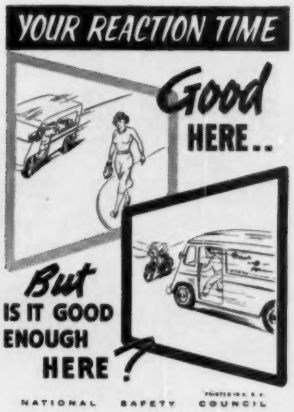
V-1491-B 17x23

V-8734-A 8½x11½

V-9441-B 17x23



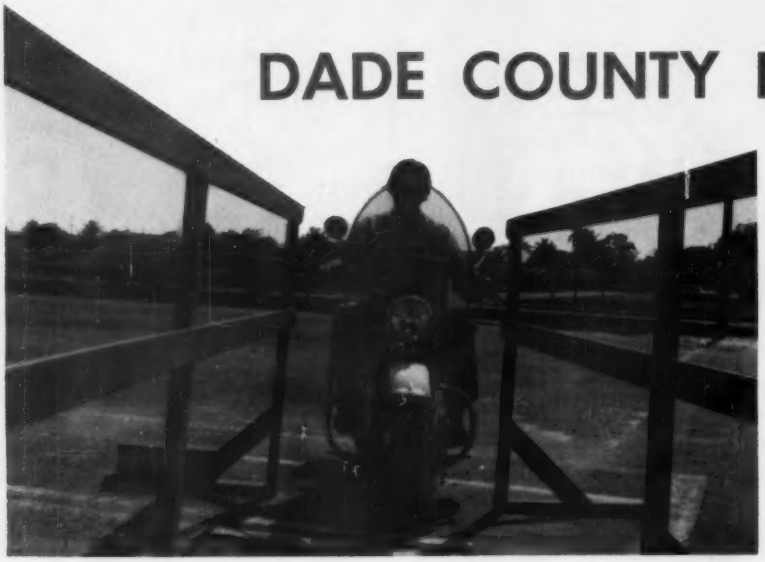
V-9465-B 17x23



V-0240-B 17x23

V-9170-A 8½x11½

V-9629-B 17x23



DADE COUNTY PICKS ACES

Vehicle Program Highlights Safety and Skill

by Charles R. Nelson

EXCITEMENT ran high when contestants lined up for the start of the second annual Metro-Dade County Road-E-O. This was the event in which county and municipal vehicle operators had a chance to show their skill and safe driving ability, and they put on a top-notch performance.

The Metro-Dade County Road-E-O is intended to serve as a direct instrument through which safe driving practices and driver skill may be displayed. It is designed to provide an effective means of recognizing the county and municipal vehicle operator who maintains a high degree of driver proficiency. When he is given the recognition he deserves, the driver develops pride and the incentive necessary to refine his occupational knowledge and skill.

In the implementation of the vehicle Road-E-O program, maximum planning and coordination must be effected between the committee and department heads. The organizing of the event includes selling the idea to supervisors and drivers. At first many employes were reluctant to enter competition for fear of failure, so participation was made glamorous enough to have prestige value.

One of the main points the committee had to consider was how events could be held without disturbing the proper functioning of county departments. This was accomplished, and interest in the program has increased and competition become keener and more intense as the program has become better known and understood. It is interesting to note that the department head who was most adamant about this affair prior to last year's event was the first to enter his staff for the second year's competition. The results clearly indicated that the majority of the larger departments were strongly in favor of continuing the program.

A critique was held immediately after last year's event to determine how the 1960 contest could be improved. The personnel staff, under the direction of Harold O. Freeburg, suggested that other municipalities be invited to participate. This, too, made the event more attractive.

The following cities sent their best drivers to compete in the Grand Finals: Miami, Miami Beach and Hialeah.

The current Road-E-O determined, through a series of obstacles, the most skillful driver in each of five classes or divisions. The winner of each was established as a Metro-Dade County champion. The champions competed the following week with the individuals sent from the municipalities. The results of the grand finals determined who was the over-all Dade County champion in a particular class. There are presently five areas of competition, i.e. sedan, light pickup truck, heavy truck, waste truck and police motorcycle. These vehicles represent those most widely utilized in the county motor vehicle fleet.

To be eligible to participate in the Road-E-O each contestant must meet certain qualifications. First he must be a driver of a county vehicle. Secondly he must not have been involved in a

The straight line test — driving one side down narrow lane marked with cones.

Charles R. Nelson is assistant safety supervisor, Dade County, Fla.

chargeable accident since the start of the fiscal year. In many instances employes drive personal vehicles on a car allowance. These employes were also permitted to enter the event.

A promotional drive was planned to sell the idea and to stimulate the desire to participate. Bulletins were sent to all departments and individual letters to the municipalities to inform all personnel that a Road-E-O would be held. Application forms were sent to all supervisors to be forwarded to interested employes. A similar application was printed in the county personnel paper, the *Personnel News*, for the employes who were unable to obtain forms elsewhere. Notices were placed on bulletin boards, and each member of the personnel department staff was instructed to "talk up" the event at every available opportunity. In every employe training class word was mentioned and encouragement given to drivers to submit applications.

All applications had to be returned to the committee before April 15th to be scheduled for the eliminations. The eliminations consumed most of the time prior to the final events. The driver eliminations within the municipalities were executed by the respective jurisdictions. The purpose behind this screening was to obtain the five best drivers in each division. The time element forbade allowing each applicant an opportunity to go through the entire course used for the finals.

Only four obstacles were used in determining and selecting the better drivers who competed for the many prizes in the finals and grand finals. Each obstacle was known as a position test. The contestant proceeded to a barrier, backed into an alley dock, parallel parked between a series of fences and stopped at a painted line. When the operator believed he was at the best possible position he had to sound his horn. Measurements were taken at each obstacle and recorded. Demerits were given for unprofessional driving, hitting an obstacle and for excessive vehicle movements while advancing through the course.

Cycles Steal Show

All competitors used the same vehicle, excepting motorcycles, assigned to the division. There were so many shapes and sizes of vehicles used by the employes that different course times and measurements had to be established for the wide variety within the division. The important rule maintained was that all vehicles provided had to have good brakes, good tires, steering functioning properly and comfortable cushions. A Road-E-O committee cannot stress the need for skillful driving while supplying entrants with vehicles that are in themselves hazardous.

The motorcycle competitions were the most exciting to watch. Possibly this was due to the intense pride that the individuals possess and the type of equipment used. A motorcycle suggests speed. In all the motorcycle events we stressed balance, maneuverability and caution. To be successful the operator had to move as slowly as possible through the difficult phases of the course. The motorcycle contestants were also eliminated with problems that differed from the finals.

The first event was one of keen competition between fellow officers. It was in this event that the ability to handle a motorcycle was most apparent. Five officers were placed side by side, each confined to a lane five feet by 105 feet long. Emotion was high and reactions sharp as each individual moved slowly towards the completion of his task. The person last to the finish line received the most merits to be added to the total score. Each instance of touching the ground or failure to remain on course received a demerit. Often an officer did not complete this event and gave up readily to the more experienced opponent.

The following events were done singularly: A contestant had to proceed to three lines, stopping before each and proceeding to the next. All movements were continuous as left and right turns were executed through a series of traffic cones. The last obstacle was the most difficult and the demerits added up rapidly. The motorcycle had to be operated around a 22 foot circle that had eight balls, seated atop one inch cones, placed about its perimeter. The operator had to weave in and out between the balls while completing the circle. Penalties were imposed for dragging the floor boards

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The competing vehicles were chosen to make up a representative selection of the county motor vehicle fleet.

The driver of this burly waste truck was required to cope with maze of barriers, backing, parking obstacles.

Motor Transport Looks to Future

Congress sessions to dramatize need for up-to-date thinking

"FLEET Safety in the Space Age" is the theme of the motor transportation program at the 1960 Congress, and if the attending fleet safety directors have the vague feeling of being at Cape Canaveral, it will be all right with the program committee. It is all planned that way.

The decor of the Illinois Room at the La Salle Hotel, launching site of the program, will be rockets and missiles of various sizes and shapes. The program topics themselves will be phrased in the language of missile- and rocket-men but these will be just gimmicks used to dramatize the need for up-to-date thinking on the problems of fleet safety supervision. The material presented on the program will be strictly down to earth.

New Idea

For the first time since the establishment of the Motor Transport Conference, there will be a joint Commercial Vehicle and Transit Section Session on Tuesday morning. J. G. Butler, director of personnel and labor relations, D. C. Transit Co. and vice-chairman of the Motor Transport Conference will preside at this session.

Keynoter on Tuesday morning will be the National Safety Council's vice president for motor transport, E. J. Buhner, chairman of the board, Silver Fleet Motor Express, Inc., of Louisville, Ky., who will speak on "Fleet Safety in the Space Age."

Buhner, a veteran trucking executive and industry leader, will look into the future and forecast some of the changes to be expected in the motor transport industry in the next 10 years.

A. C. Butler, director, National Highway User's Conference, will talk about "Space Age Roads," the kind of highways that will be coming into use in the next decade, and what effect these will have on the safety record of the industry.

"Space Age Vehicles" will be the title of a talk by George V. Kieffer, director, fleet section, General Motors Corp. Without disclosing any corporation secrets, Kieffer will describe some of the exciting innovations in vehicle engineering and design that will be coming in the years immediately ahead and how these developments will affect safety.

Always a vital ingredient in the operation of any motor transportation operation is the driver and there are signs that tomorrow's truck, bus, and taxicab drivers may be a somewhat different article than those of today. Frank P. Lowery, director of field services for the Auto-Industries Highway Safety Committee, in a talk entitled "Space Age Drivers," will draw a picture of tomorrow's professional driver.

On Tuesday afternoon, the Commercial Vehicle Section will conduct a symposium on "Space Age Supervision" moderated by Paul H. Coburn, director of the safety department of Hennis Freight Lines, Inc., of Winston-Salem, N. C.

T. A. Drescher, transportation committee, Milk Industry Foundation, will discuss "The Supervisor's Safety Responsibilities."

Still to be announced is the name of the speaker who will present the subject "Finding and Correcting Employe Injury Causes."

"Finding and Correcting Vehicle Accident Causes" will be presented by Sam G. Athey, Jr., supervisor of safety and training for Safeway Trailways of Washington, D. C.

Closing out an afternoon devoted to a discussion of important supervisory duties will be T. A. Kraklow, safety director for Deere & Co., of Moline, Ill., who will talk on the subject "The Human Element in Fleet Supervision."

On Tuesday afternoon the transit section will hear a program featuring a judge, the chairman of the board of the nation's largest transit authority, and one of the top safety engineers of America.

Leading off the program with a talk "A Judicial Observation of Public Transit Safety" will be the Honorable Joseph R. Hess, judge of the Court of Common Pleas of Hamilton County, Ohio. Judge Hess will describe how a city transit company looks from the other side of the bench and why a good accident prevention program makes a company look better in court.

Chairman Charles L. Patterson of the New York City Transit Authority will talk about what top management thinks of the accident prevention program as a cost saving activity. Title of Patterson's talk will be "Your Safety Program as it Affects Profit."

The managing director of the American Society of Safety Engineers, A. C. Blackman, will be the third speaker of the afternoon. He will offer some observations about the danger of an industry losing its safety know-how unless it has a carefully thought out policy for the development of well-trained safety directors. Title of Blackman's talk will be "Are You Training Future Safety Directors?"

What It Takes

On Wednesday morning, the Commercial Vehicle Section will conduct a symposium on "Space Age Driver Qualifications" moderated by A. L. Hauck, director of safety and public relations for Transportation Underwriters, Inc., Indianapolis, Ind.

Speaking on "City Driver Qualifications" will be Daniel F. McKnight, vice president, United Parcel Service, New York City.

Qualifications of tractor-trailer and super rig drivers will be discussed by T. A. Harrison, vice president of operations for the Western Express Co. of Clevland, Ohio.

James R. Neely, director of safety and personnel for the Greyhound Corp. will talk on "Intercity Bus Driver Qualifications."

Presiding over the Wednesday morning session for the Transit Section will be Paul J. Fanning, director, San Francisco Public Utilities Commission, vice-chairman of the Transit Section.

The morning will start off with a one hour presentation entitled "Getting More Mileage Out of Audio Visual Aids" by Glenn Griffin, training consultant who, before his retirement, was director of training for the industrial department of the National Safety Council.

This will be followed by a one hour symposium entitled "Stopping Clinic."

Members of the clinic will include Frank MacManus, vice president and maintenance manager of the Public Service Coordinated Transport of Maplewood, N. J. who will talk about "Safe Tires" in a paper devoted to a description of actual stopping distance tests conducted by the National Association of Motor Bus Owners using tires of different tread depth.

Second on the symposium will be A. E. Savage, director of the mechanical department for the D. C. Transit System, Inc., of Washington, D. C. Savage will define safe brakes as seen through the eyes of a maintenance superintendent for a large transit company.

While safe tires and safe brakes are necessary for stop and go city driving, these two ingredients can be brought to nothing by poor braking habits of bus operators. John A. Baker, director of training and accident prevention, Chicago Transit Authority, will tell the importance of "Safe Braking Habits."

On Wednesday, the Commercial Vehicle Section will conduct a symposium on the subject of "Space Age Motivations" led by Karl Schulze, senior safety engineer for the Standard Oil Co. of California — Western Operations.

Marvin F. Oberg, assistant vice president for operations of the American Telephone and Telegraph Co. of New York will be the first speaker. Title of his talk will be "Effective Use of Safety Materials."

This will be followed by a one hour talk on "The A. B. C.'s of Effective Safety Communications." The speaker or speakers for this part of the program have not been announced.

Closing out the Wednesday afternoon program for the Commercial Vehicle Section will be Paul Jones, director of public information for the National Safety Council who will speak on the subject, "Effective Use of Special Safety Campaigns."

The Transit Section's Wednesday afternoon session will be devoted to conducting three round table discussion periods. Presiding over the session will be Patrick S. Sirois, safety director, Miami Transit Co. and program chairman of the Transit Section.

Topics and discussion leaders are "How to Handle Habitual Gripers" by Houston P. Ishmael, general manager, Cincinnati, Newport and Covington Transportation Co., Newport, Ky; "How Is Your Company Developing Safety Supervisors?" by E. J. Slingerland, safety director, Seattle Transit System, Seattle, Wash., and "Your Favorite Story of an Operator Rehabilitated" by Clarence A. Baughman, general manager, Youngstown Transit Co., Youngstown, Ohio.

The Joint Commercial Vehicle and Transit Section sessions on Thursday

Turn Page

School Bus Sessions

Three half-day sessions devoted to the problems of school transportation will again be held in conjunction with the Motor Transport sessions at the La Salle Hotel during the 1960 National Safety Congress and Exposition.

Presiding over the sessions will be Bill Lemon, director of school bus safety for the State of New Mexico Department of Education.

At the Tuesday afternoon sessions, Alfred C. Finch, manager, motor transport department, National Safety Council, will welcome the school bus representatives.

A summary and discussion of school bus accidents for 1959 will be presented by William J. Mangum, specialist in safety and training for the General Electric Co. of Tell City, Ind.

This will be followed by Harold L. Smith, director of training, Institute of Driver Behavior, sponsored by the Ford Division of the Ford Motor Co., who will present his famous analysis of seeing habits as related to safe driving. Title of Smith's talk is "The Eyes Have It."

On Wednesday morning, school transportation representatives will hear a talk, "Why Not Uniform School Transportation Regulations" by Walter M. Gordon, director of transportation, Board of Education, Baltimore County, Towson, Md.

This will be followed by a symposium, "Role of the Insurance Engineer in School Bus Transportation," moderated by J. Pope Baird, specialist in transportation for the State of Florida Department of Education.

Appearing on the symposium will be Douglas Fergusson, field safety specialist for the Nationwide Insurance Company, talking on "How the Insurance Engineer Can Help Supervision"; Claude Stubbe, chief engineer, Mutual Service Insurance Company, St. Paul, Minnesota, discussing "How the Insurance Engineer Can Help the Safety Program"; and Hugh E. Rhodes, director, safety department, Farm Bureau Insurance Company, Indianapolis, Indiana, who will talk on "How the Insurance Engineer Can Help With Records."

"How the Insurance Engineer Can Help in Selection and Training" will be presented by a speaker to be announced.

Following this symposium, Harry D. Fletcher of the National Committee for Motor Fleet Supervisor Training, Pennsylvania State University, will present a talk entitled "School Bus Supervisors Need Fleet Supervisor Training, Too."

At the Wednesday afternoon session, school bus delegates will hear Judson Nichols, coordinator, school bus driver and maintenance training, State of Florida Department of Education discuss how "Drivers Can Help Spot Mechanical Troubles."

Two other talks to be presented Wednesday afternoon are "How to Select Your School Bus," and "Regular School Bus Inspections—a Must."

Final event on the program will be "Good Maintenance Aids Safety" by Harold Pelligrino, safety engineer, State Highway Commission of Kansas.

morning will be presided over by J. P. Hightower, Consolidated Freightways, chairman of the Motor Transport Conference of the National Safety Council.

Principal speaker will be Howard Pyle, President of the National Safety Council who will talk on "The Concept of Total Safety."

Following President Pyle's talk, E. J. Buhner, vice-president for motor transport will install the 1960-1961 officers of the Commercial Vehicle and Transit Sections.

This will be followed by the presentation of awards to winners of the National Fleet Safety Contest. Contest Chairman Harold K. Halbrooks, director, accident prevention division, National Automobile Transporters Association, will present the awards.

The Wind-up

Starting promptly at 12:00 noon, Thursday, there will be a luncheon in the grand ballroom of the La Salle Hotel honoring contest winners and guests and sponsored for the 13th year by the General Motors Corp.

The name of the luncheon speaker and the title of his address will be announced in the final Congress program.

A traditional event on the luncheon program is the presentation of the Marcus A. Dow Memorial Award to the outstanding safety director of the year. The presentation this year will be made to Richard O. Olson, safety director, Dan Dugan Oil Transport Co., Sioux Falls, S. D.

Heading the planning group that put together this year's program are W. T. Gowens, director of safety and personnel for Pilot Freight Carriers, Winston-Salem, N. C., chairman of the program committee of the Motor Transport Conference; J. W. Lumpkin, manager, safety division, Railway Express Agency, Inc., New York, N. Y., chairman of the Commercial Vehicle Section program committee, and Patrick S. Sirois, safety director, Miami Transit Co., Miami, Florida, chairman of the program committee of the Transit Section.

Pictures With a Plus

THE picture above was taken by Dick Henderson, editor of the *Texas City Carbide News*. It is a picture that tells a story.

There was a time when telling the traffic safety story consisted of publishing pictures of the bloody, mangled bodies of accident victims. Today, many newspapers flatly refuse to publish such pictures. Furthermore, there are serious doubts as to whether or not horror pictures really register with the public.

These problems are forcing safety publicists to find new ways to tell the traffic safety story. (See *Impact Sells the Story*, TRAFFIC SAFETY, April 1960.)

The picture above highlights the dangers of backing out of a driveway without taking special care to look for small children. There is no gore in the picture, no horror. But the huge tire and the small rubber doll combine to make a picture with dramatic impact.

The picture could well be a model of imagination and skill for safety publicists everywhere.

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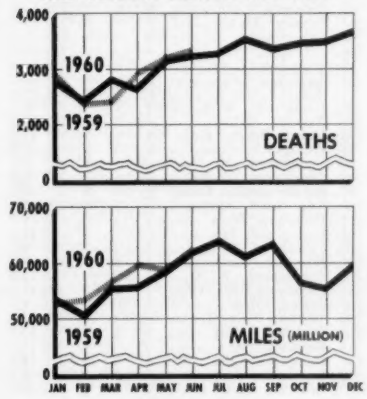
three largest were: Schenectady, N. Y. (98,000), Columbus, Ga. (89,400) and Pawtucket, R. I. (86,800).

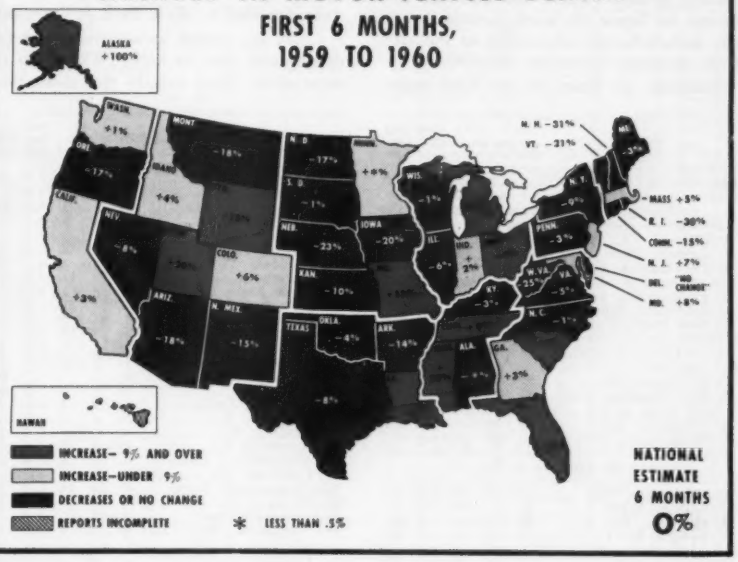
The leading cities in each population group at the end of six months, ranked according to the number of deaths per 10,000 registered vehicles were:

	Reg. Rate	Pop. Rate
Group I (Over 1,000,000)		
Chicago, Ill.	2.1	5.7
Detroit, Mich.	3.0	10.4
Los Angeles, Calif.	3.2	17.2
Group II (750,000 to 1,000,000)		
St. Louis, Mo.	2.3	8.4
San Francisco, Calif.	3.0	11.3
Cleveland, Ohio	3.4	10.6
Group III (500,000 to 750,000)		
Milwaukee, Wis.	1.4	6.2
Seattle, Wash.	1.5	7.7
Houston, Tex.	1.8	10.7
Group IV (350,000 to 500,000)		
Denver, Colo.	1.7	10.1
Portland, Ore.	1.8	10.7
Columbus, Ohio	1.9	6.7
Group V (200,000 to 350,000)		
Grand Rapids, Mich.	0.7	3.8
Wichita, Kan.	0.7	4.5
Providence, R. I.	0.8	4.0
Group VI (100,000 to 200,000)		
Madison, Wis.	0.4	1.8
Arlington, Va.	0.6	2.5
Saginaw, Mich.	0.7	3.7
Group VII (50,000 to 100,000)		
Topeka, Kan.	0.0	0.0
Schenectady, N. Y.	0.0	0.0
Colorado Springs, Colo.	0.0	0.0
Group VIII (25,000 to 50,000)		
Tyler, Tex.	0.0	0.0
Yakima, Wash.	0.0	0.0
Cheyenne, Wyo.	0.0	0.0
Group IX (10,000 to 25,000)		
Boulder, Colo.	0.0	0.0
Mesa, Ariz.	0.0	0.0
Greeley, Colo.	0.0	0.0

MONTHLY MOTOR VEHICLE DEATHS AND TRAFFIC TRENDS 1959-1960



CHANGES IN MOTOR-VEHICLE DEATHS FIRST 6 MONTHS, 1959 TO 1960



MOTOR VEHICLE DEATHS AND CHANGES

Months	DEATHS				PERCENTAGE CHANGES				
					Corresponding Month			4 Mos. Mov. Ave.*	
	1956	1958	1959	1960	1956-1960	1958-1959	1959-1960	1958-1959	1959-1960
January	2,954	2,709	2,790	2,850	— 2%		+ 2%		0%
February	2,652	2,398	2,430	2,380	—10%		— 2%		0%
March	2,940	2,598	2,860	2,400	—18%		—16%		— 3%
April	2,970	2,595	2,650	2,910	— 2%		+10%		— 2%
May	3,094	2,937	3,110	3,230	+ 3%		+ 4%		— 1%
June	3,338	3,078	3,260	3,320	0%		+ 2%		0%
6 Months	17,948	16,315	17,100	17,090	— 5%		0%		
July	3,555	3,098	3,250			+ 5%		+ 5%	
August	3,535	3,550	3,510			— 1%		+ 4%	
September	3,653	3,325	3,360			+ 1%		+ 3%	
October	3,476	3,586	3,440			— 4%		0%	
November	3,603	3,526	3,490			— 1%		— 1%	
December	3,858	3,581	3,650			+ 2%		— 1%	
Total	39,628	36,981	37,800						

All 1956 and 1958 figures are from the National Office of Vital Statistics. The 1959 and 1960 figures are National Safety Council estimates.

The 1960 national estimate is arrived at by assuming that the percentage change from 1959 to 1960 in the states reporting for both years reflects the 1959-1960 change in the entire country. First reports are preliminary, so revisions are made from time to time as later reports are received for the various months. Thus, figures above for 1960 may differ slightly from figures for the same months which will be published in future issues of TRAFFIC SAFETY.

*Four Months Moving Average is based on changes between the totals for four months instead of one month. For example, the June figure shows the change between the totals for March-June 1959 and March-June 1960, etc. Adding several months together tends to smooth out single month changes which may be affected by differences in the number of weekends in a month from one year to the next, random variations, etc.

TRAFFIC DEATHS—CITY RECORDS

The table covers only motor-vehicle deaths resulting from traffic accidents that occurred in the city. Nontraffic motor-vehicle deaths (where the accident occurred on home or work premises) are not included; nor are deaths in the city from accidents occurring outside.

Rankings are based on the 1960 registration death rate which is the number of deaths per 10,000 registered motor vehicles on an annual basis. Vehicle registration figures are for the year 1959 and were supplied by R. L. Polk & Company.

Cities are ranked by registration death rates—from low to high. When two or more cities have exactly the same rate, ranking is by total vehicle registrations—from large to small.

Cities shown in heavy type have improved in 1960 compared with 1959.

The population death rate is the number of deaths per 100,000 population on an annual basis. Populations are as of April, 1950, or later censuses taken by the U. S. Bureau of the Census.

	Six Months 1960	1959	1958	1960 Reg. Rate	1960 Pop. Rate
ALL REPORTING CITIES				2.2	9.0
Group I (1,000,000 and over)					
1. Chicago, Ill.	106	137	142	2.1	5.7
2. Detroit, Mich.	100	81	79	3.0	10.4
3. Los Angeles, Calif.	193	156	167	3.2	17.2
All cities in this group				3.2	8.8
4. Philadelphia, Pa.	87	75	81	3.4	8.3
5. Baltimore, Md.	63	48	64	3.9	12.2
6. New York, N. Y.	278	351	312	4.0	7.1
Group II (750,000 to 1,000,000)					
1. St. Louis, Mo.	36	40	30	2.3	8.4
2. San Francisco, Calif.	44	45	31	3.0	11.3
All cities in this group				3.1	10.1
3. Cleveland, Ohio	49	41	45	3.4	10.6
4. Washington, D. C.	43	33	26	3.8	10.2
Group III (500,000 to 750,000)					
1. Milwaukee, Wis.	22	25	23	1.4	6.2
2. Seattle, Wash.	22	20	34	1.5	7.7
3. Houston, Tex.	38	61	45	1.8	10.7
4. Buffalo, N. Y.	26	24	32	2.3	8.7
All cities in this group				2.4	9.8
5. Boston, Mass.	22	29	30	2.6	6.1
6. San Diego, Calif.	30	36	44	3.0	12.0
7. Cincinnati, Ohio	33	27	19	3.0	11.5
8. Pittsburgh, Pa.	30	24	32	3.0	8.8
9. Dallas, Tex.	46	31	31	3.0	15.8
10. New Orleans, La.	37	27	36	4.1	12.3
Group IV (350,000 to 500,000)					
1. Denver, Colo.	24	22	23	1.7	10.1
2. Portland, Ore.	22	23	21	1.8	10.7
3. Columbus, Ohio	16	14	24	1.9	6.7
4. Oakland, Calif.	16	27	20	2.1	8.3
5. Birmingham, Ala.	18	27	21	2.5	10.1
All cities in this group				2.6	11.4
6. Atlanta, Ga.	29	32	41	3.1	11.8
7. Phoenix, Ariz.	30	26	20	3.2	14.0
8. Memphis, Tenn.	29	14	12	3.3	11.9
9. San Antonio, Tex.	37	21	22	3.4	16.3
10. Kansas City, Mo.	32	20	16	4.1	13.3
Group V (200,000 to 350,000)					
1. Grand Rapids, Mich.	4	9	8	0.7	3.8
2. Wichita, Kan.	5	5	5	0.7	4.5
3. Providence, R. I.	5	7	8	0.8	4.0
4. Omaha, Neb.	6	17	11	1.0	4.3
5. Miami, Fla.	13	23	25	1.2	10.0
6. Rochester, N. Y.	9	4	11	1.3	5.2
7. Toledo, Ohio	11	5	9	1.4	6.4
All cities in this group				1.9	9.4
8. Fort Worth, Tex.	17	18	16	2.1	10.3
9. Syracuse, N. Y.	8	3	4	2.1	7.5
10. Dayton, Ohio	16	8	9	2.1	10.6
11. Norfolk, Va.	10	6	12	2.2	6.9
12. Flint, Mich.	12	6	8	2.2	11.1
13. St. Paul, Minn.	16	12	20	2.3	10.2
14. Akron, Ohio	15	19	28	2.3	9.7
15. Worcester, Mass.	7	14	7	2.4	6.9
16. Jacksonville, Fla.	19	12	19	2.5	15.2
17. Tampa, Fla.	18	14	12	2.6	13.3
18. Richmond, Va.	16	10	13	2.7	13.5
19. Oklahoma City, Okla.	25	11	14	2.8	17.5
20. Long Beach, Calif.	23	13	13	3.0	13.7
21. El Paso, Tex.	13	21	20	3.0	10.4
Group VI (100,000 to 200,000)					
1. Madison, Wis.	1	3	2	0.4	1.8
2. Arlington, Va.	2	5	3	0.6	2.5
3. Saginaw, Mich.	2	1	2	0.7	3.7
4. Trenton, N. J.	3	5	4	0.8	4.7
5. Lincoln, Neb.	2	0	1	0.8	3.3
6. Fresno, Calif.	4	7	4	1.0	6.5
7. Hartford, Conn.	3	3	1	1.0	3.2
8. Lansing, Mich.	3	5	6	1.0	5.4
9. Des Moines, Iowa	5	9	7	1.1	5.5
10. Baton Rouge, La.	4	11	9	1.1	5.3
11. Yonkers, N. Y.	3	0	1	1.1	3.3
12. Utica, N. Y.	2	3	3	1.1	3.9
13. Berkeley, Calif.	3	4	5	1.2	5.1
14. Canton, Ohio	4	1	5	1.2	6.4
15. Austin, Tex.	5	10	2	1.4	6.1
16. Roanoke, Va.	3	1	3	1.4	5.9
17. Duluth, Minn.	3	7	11	1.4	5.7
18. South Bend, Ind.	5	3	2	1.5	7.6
19. Erie, Pa.	5	1	1	1.5	7.3
20. Elizabeth, N. J.	5	3	7	1.5	5.1
21. Dearborn, Mich.	6	5	14	1.6	9.3
22. Tacoma, Wash.	7	4	8	1.6	8.9
23. Niagara Falls, N. Y.	3	1	5	1.6	5.8
24. Spokane, Wash.	8	5	7	1.7	8.5
25. Gary, Ind.	6	7	8	1.8	6.8
26. Pasadena, Calif.	6	9	7	1.8	10.5
27. Amarillo, Tex.	5	4	2	1.8	10.0
28. Reading, Pa.	4	3	7	1.8	7.0
29. Rockford, Ill.	6	3	2	1.8	10.0
30. Youngstown, Ohio	6	7	8	1.8	6.5
31. Savannah, Ga.	5	5	3	1.8	7.7
32. Chattanooga, Tenn.	6	13	11	1.9	9.2
33. Montgomery, Ala.	5	3	2	1.9	8.6
34. Evansville, Ind.	6	8	2	1.9	7.1
35. Springfield, Mass.	6	5	8	2.0	7.2
All cities in this group				2.1	10.0
36. Glendale, Calif.	6	7	4	2.2	10.5
37. Fort Wayne, Ind.	9	6	5	2.2	11.7
38. Little Rock, Ark.	6	3	4	2.3	11.2
39. Sacramento, Calif.	13	12	7	2.3	16.5
40. Salt Lake City, Utah	15	6	10	2.3	15.6
41. Albuquerque, N. M.	10	13	8	2.4	11.8
42. Corpus Christi, Tex.	9	3	11	2.5	12.4
43. Lubbock, Tex.	7	10	3	2.5	13.3
44. New Haven, Conn.	7	5	4	2.5	8.4
45. Bridgeport, Conn.	8	6	3	2.6	9.5
46. Hammond, Ind.	5	8	8	2.7	9.2
47. Peoria, Ill.	9	0	2	2.8	15.8
48. San Jose, Calif.	16	11	10	3.0	20.2
49. Waterbury, Conn.	6	2	3	3.1	10.6
50. Shreveport, La.	12	6	5	3.1	14.9
51. Newport News, Va.	5	2	9	3.2	9.6
52. Kansas City, Kan.	12	7	1	3.3	18.5
53. Allentown, Pa.	8	5	4	3.4	14.3
54. Waco, Tex.	8	8	3	3.4	15.8
55. Nashville, Tenn.	15	9	12	3.5	17.2
56. Mobile, Ala.	13	14	12	3.7	15.0
57. St. Petersburg, Fla.	22	16	7	4.2	33.1
58. Jackson, Miss.	12	7	4	4.2	20.4
59. Charlotte, N. C.	21	11	7	5.5	26.9
Group VII (50,000 to 100,000)					
1. Topeka, Kan.	0	5	4	0.0	0.0
2. Schenectady, N. Y.	0	1	3	0.0	0.0
3. Colorado Spgs., Colo.	0	1	2	0.0	0.0
4. Cedar Rapids, Iowa	0	0	3	0.0	0.0
5. Columbus, Ga.	0	6	1	0.0	0.0
6. Lexington, Ky.	0	3	3	0.0	0.0
7. San Mateo, Calif.	0	1	3	0.0	0.0
8. White Plains, N. Y.	0	2	1	0.0	0.0
9. Pawtucket, R. I.	0	3	1	0.0	0.0
10. Council Bluffs, Iowa	0	2	3	0.0	0.0
11. Elmira, N. Y.	0	1	0	0.0	0.0
12. Medford, Mass.	0	0	0	0.0	0.0
13. Passaic, N. J.	0	2	1	0.0	0.0
14. Binghamton, N. Y.	1	1	2	0.5	2.4
15. Sioux City, Iowa	1	11	3	0.6	2.3
16. Joliet, Ill.	1	3	3	0.6	3.3
17. Santa Monica, Calif.	1	3	5	0.6	2.6
18. Bethlehem, Pa.	1	0	0	0.6	2.7
19. Kenosha, Wis.	1	7	1	0.6	3.1
20. Lake Charles, La.	1	3	4	0.7	3.6
21. Anderson, Ind.	1	1	0	0.7	3.9
22. Mansfield, Ohio	1	0	2	0.7	3.8
23. Mount Vernon, N. Y.	1	3	1	0.7	2.6
24. Portland, Maine	1	1	0	0.7	2.5
25. East Orange, N. J.	1	0	2	0.7	2.3
26. Portsmouth, Va.	1	3	2	0.8	2.3
27. Beaumont, Tex.	2	10	4	0.8	4.3
28. Torrance, Calif.	2	6	2	0.8	4.1
29. Pueblo, Colo.	2	8	2	0.9	4.8
30. East St. Louis, Ill.	2	5	6	0.9	4.3
31. Irvington, N. J.	1	0	0	0.9	3.2
32. Euclid, Ohio	1	0	3	0.9	3.2
33. Alexandria, Va.	2	3	2	1.0	4.6
34. Springfield, Ohio	2	5	2	1.0	4.5
35. Pittsfield, Mass.	1	1	3	1.0	3.6
36. Hayward, Calif.	2	4	4	1.1	7.3
37. Pensacola, Fla.	2	4	2	1.1	7.8
38. Muncie, Ind.	2	1	2	1.1	6.1
39. Huntington, W. Va.	2	4	3	1.1	4.6
40. West Allis, Wis.	1	1	2	1.1	3.2
41. Woonsocket, R. I.	1	0	0	1.1	4.0
42. San Leandro, Calif.	2	1	2	1.2	6.3
43. Wilkes-Barre, Pa.	2	1	4	1.2	5.2
44. Santa Ana, Calif.	3	5	0	1.2	8.7
45. Warren, Ohio	2	5	1	1.2	6.3
46. Johnstown, Pa.	2	3	2	1.2	6.3
47. Jackson, Mich.	2	3	0	1.2	6.5
48. Springfield, Ill.	3	3	4	1.3	7.4
49. Bay City, Mich.	2	3	0	1.3	6.6
50. Sioux Falls, S. D.	2	3	1	1.3	6.7
51. St. Joseph, Mo.	2	2	2	1.3	5.1
52. Orlando, Fla.	5	6	0	1.3	11.2
53. Asheville, N. C.	2	0	2	1.3	7.5
54. Winston-Salem, N. C.	3	3	5	1.4	6.6
55. Battle Creek, Mich.	2	1	0	1.4	7.3
56. Evanston, Ill.	2	0	0	1.4	5.2
57. St. Clair Shores, Mich.	2	3	2	1.4	6.4
58. Decatur, Ill.	3	3	6	1.4	7.6
59. Cambridge, Mass.	2	1	4	1.4	4.0
60. New Rochelle, N. Y.	2	1	2	1.5	5.4
61. Abilene, Tex.	3	5	1	1.6	9.9
62. Hampton, Va.	2	5	13	1.6	5.0
63. Columbia, S. C.	4	3	1	1.6	8.3
64. Lakewood, Ohio	2	3	1	1.6	5.7
65. Terre Haute, Ind.	3	0	2	1.7	8.2
66. Fort Smith, Ark.	2	4	5	1.7	6.7
67. Wheeling, W. Va.	2	0	5	1.7	6.8
68. Oak Park, Ill.	2	0	1	1.7	6.5
69. Davenport, Iowa	3	3	1	1.7	7.4
70. Fullerton, Calif.	2	0	0	1.7	7.9
All cities in this group				1.7	8.1
71. Stockton, Calif.	5	9	5	1.8	13.1
72. Richmond, Calif.	3	5	3	1.8	6.0
73. Bayonne, N. J.	2	1	1	1.8	5.2
74. Reno, Nev.	3	2	3	1.8	11.5
75. Lynchburg, Va.	2	2	1	1.9	7.5
76. Tuscaloosa, Ala.	2	6	2	1.9	7.0
77. Fort Lauderdale, Fla.	5	2	4	1.9	15.9
78. Lwr. Merion Twp., Pa.	2	2	1	2.0	6.9
79. Aurora, Ill.	3	1	1	2.0	10.4
80. Bloomfield, N. J.	2	0	0	2.0	7.9
81. Lorain, Ohio	3	1	4	2.1	9.8
82. Hamilton, Ohio	4	3	3	2.1	11.0
83. Royal Oak, Mich.	4	8	1	2.1	11.2
84. Gadsden, Ala.	2	2	2	2.2	6.2
85. Stamford, Conn.	4	2	3	2.2	9.2
86. Riverside, Calif.	5	6	4	2.2	13.2
87. Pontiac, Mich.	5	2	8	2.3	12.0
88. Lynn, Mass.	3	3	2	2.3	6.1
89. Lancaster, Pa.	4	2	2	2.3	11.8
90. Waterloo, Iowa	4	1	5	2.4	11.4
91. Anaheim, Calif.	6	11	0	2.5	15.3
92. Burbank, Calif.	6	6	2	2.5	13.2
93. Kalamazoo, Mich.	5	1	4	2.5	13.3
94. Pomona, Calif.	4	4	4	2.5	12.9
95. Miami Beach, Fla.	4	5	5	2.5	15.7
96. Greenwich, Conn.	2	4	1	2.6	7.8
97. Manchester, N. H.	4	5	1	2.7	9.1
98. Charleston, W. Va.	4	6	1	2.7	10.9
99. San Bernardino, Calif.	8	10	8	2.7	19.3
100. Ann Arbor, Mich.	4	1	2	2.8	14.7
101. Dubuque, Iowa	3	0	0	2.8	11.7
102. Springfield, Mo.	6	2	3	2.8	15.0
103. Charleston, S. C.	3	0	2	2.9	8.5
104. Norwalk, Conn.	3	3	1	3.0	9.8
105. Greensboro, N. C.	6	6	5	3.0	14.7
106. Cuyahoga Falls, Ohio	3	0	0	3.0	11.9
107. Parma, Ohio	3	0	0	3.0	8.2
108. Wichita Falls, Tex.	6	2	4	3.1	13.3
109. Waltham, Mass.	3	1	2	3.2	12.0
110. Durham, N. C.	6	5	4	3.4	16.8
111. Compton, Calif.	6	6	5	3.5	18.8
112. Brookline, Mass.	3	2	4	3.5	10.5
113. Warren, Mich.	6	6	5	3.6	18.9

	Six Months 1960	1959	1958	1960 Reg. Rate	1960 Pop. Rate
114. Tucson, Ariz.	10	9	3	3.6	28.6
115. Greenville, S. C.	6	2	1	3.6	18.6
116. Ogden, Utah	7	1	4	3.8	21.5
117. Lincoln Park, Mich.	4	2	2	4.1	14.8
118. Covington, Ky.	5	2	2	4.1	13.7
119. Las Vegas, Nev.	9	2	1	4.5	34.0
120. Atlantic City, N. J.	4	3	2	4.5	13.0
121. East Chicago, Ind.	4	0	3	4.6	13.4
122. Raleigh, N. C.	8	3	3	4.6	22.6
123. Santa Barbara, Calif.	9	3	4	4.8	32.3
124. Brockton, Mass.	6	5	5	5.1	19.1

Group VIII (25,000 to 50,000)

1. Tyler, Tex.	**0**	**2**	**0**	**0.0**	**0.0**
2. Yakima, Wash.	0	0	0	0.0	0.0
3. Cheyenne, Wyo.	**0**	**2**	**0**	**0.0**	**0.0**
4. Whittier, Calif.	**0**	**1**	**0**	**0.0**	**0.0**
5. Plainfield, N. J.	0	0	2	0.0	0.0
6. Appleton, Wis.	**0**	**3**	**0**	**0.0**	**0.0**
7. Hutchinson, Kan.	**0**	**1**	**1**	**0.0**	**0.0**
8. Salina, Kan.	**0**	**2**	**1**	**0.0**	**0.0**
9. Easton, Pa.	**0**	**1**	**0**	**0.0**	**0.0**
10. Zanesville, Ohio	**0**	**1**	**1**	**0.0**	**0.0**
11. Pine Bluff, Ark.	0	0	1	0.0	0.0
12. University City, Mo.	**0**	**1**	**1**	**0.0**	**0.0**
13. Highland Pk., Mich.	**0**	**4**	**3**	**0.0**	**0.0**
14. Eau Claire, Wis.	**0**	**2**	**1**	**0.0**	**0.0**
15. Marion, Ohio	**0**	**2**	**1**	**0.0**	**0.0**
16. Portsmouth, Ohio	0	0	0	0.0	0.0
17. Ventura, Calif.	**0**	**3**	**2**	**0.0**	**0.0**
18. Menlo Park, Calif.	0	0	0	0.0	0.0
19. Granite City, Ill.	**0**	**2**	**1**	**0.0**	**0.0**
20. Chicopee, Mass.	**0**	**3**	**0**	**0.0**	**0.0**
21. Wausau, Wis.	**0**	**1**	**1**	**0.0**	**0.0**
22. Galesburg, Ill.	**0**	**1**	**0**	**0.0**	**0.0**
23. Sandusky, Ohio	**0**	**2**	**0**	**0.0**	**0.0**
24. Mountain View, Calif.	**0**	**1**	**3**	**0.0**	**0.0**
25. Manhattan Bch., Calif.	0	0	0	0.0	0.0
26. Monrovia, Calif.	**0**	**2**	**0**	**0.0**	**0.0**
27. Findlay, Ohio	0	0	2	0.0	0.0
28. Fair Lawn, N. J.	0	0	2	0.0	0.0
29. Baldwin Park, Calif.	0	0	2	0.0	0.0
30. Rock Hill, S. C.	**0**	**1**	**2**	**0.0**	**0.0**
31. Fond du Lac, Wis.	**0**	**1**	**2**	**0.0**	**0.0**
32. Park Ridge, Ill.	0	0	1	0.0	0.0
33. Columbia, Mo.	**0**	**2**	**0**	**0.0**	**0.0**
34. Mason City, Iowa	0	0	1	0.0	0.0
35. Steubenville, Ohio	**0**	**1**	**1**	**0.0**	**0.0**
36. Oak Park, Mich.	0	0	0	0.0	0.0
37. Kearny, N. J.	**0**	**1**	**1**	**0.0**	**0.0**
38. Lockport, N. Y.	0	0	1	0.0	0.0
39. Walla Walla, Wash.	0	0	2	0.0	0.0
40. Birmingham, Mich.	0	0	0	0.0	0.0
41. Minot, N. D.	**0**	**2**	**0**	**0.0**	**0.0**
42. Mt. Clemens, Mich.	0	0	0	0.0	0.0
43. Redlands, Calif.	**0**	**1**	**2**	**0.0**	**0.0**
44. Provo, Utah	0	0	0	0.0	0.0
45. Norman, Okla.	**0**	**2**	**1**	**0.0**	**0.0**
46. Middletown, Conn.	**0**	**1**	**1**	**0.0**	**0.0**
47. Burlington, Vt.	**0**	**1**	**0**	**0.0**	**0.0**
48. New Kensington, Pa.	**0**	**2**	**0**	**0.0**	**0.0**
49. Watertown, Mass.	0	0	0	0.0	0.0
50. Amsterdam, N. Y.	**0**	**1**	**1**	**0.0**	**0.0**
51. Webster Groves, Mo.	0	0	0	0.0	0.0
52. Annapolis, Md.	**0**	**1**	**1**	**0.0**	**0.0**
53. Oak Ridge, Tenn.	**0**	**1**	**2**	**0.0**	**0.0**
54. Denton, Tex.	**0**	**3**	**0**	**0.0**	**0.0**
55. Maple Heights, Ohio	0	0	0	0.0	0.0
56. Winona, Minn.	0	0	0	0.0	0.0
57. East Lansing, Mich.	**0**	**1**	**1**	**0.0**	**0.0**
58. Park Forest, Ill.	0	0	0	0.0	0.0
59. Belmont, Mass.	0	0	0	0.0	0.0
60. Lackawanna, N. Y.	0	0	1	0.0	0.0
61. Palo Alto, Calif.	**1**	**3**	**0**	**0.6**	**4.2**
62. Midland, Tex.	1	1	3	0.7	5.5
63. Redwood City, Calif.	1	1	2	0.7	5.1
64. Ontario, Calif.	1	1	1	0.7	4.8
65. Vancouver, Wash.	1	0	1	0.7	4.8
66. Great Falls, Mont.	1	1	3	0.8	4.3
67. Modesto, Calif.	1	0	4	0.8	5.9
68. Poughkeepsie, N. Y.	1	1	2	0.8	4.9
69. Casper, Wyo.	1	0	0	0.8	5.6
70. Everett, Wash.	**1**	**3**	**0**	**0.8**	**5.7**
71. Lafayette, Ind.	1	1	0	0.9	4.9
72. Beverly Hills, Calif.	**1**	**2**	**1**	**0.9**	**6.6**
73. Wilmington, N. C.	**1**	**3**	**2**	**0.9**	**4.4**
74. Warwick, R. I.	**1**	**4**	**4**	**0.9**	**4.7**
75. Newark, Ohio	1	0	3	1.0	5.0
76. Quincy, Ill.	**1**	**4**	**2**	**1.0**	**4.7**
77. Rapid City, S. D.	**1**	**3**	**2**	**1.0**	**5.0**
78. Rock Island, Ill.	**1**	**3**	**1**	**1.0**	**4.0**
79. Rochester, Minn.	1	0	2	1.0	6.4
80. West Covina, Calif.	1	0	3	1.0	4.2
81. Pocatello, Idaho	**1**	**2**	**7**	**1.0**	**7.4**
82. Gainesville, Fla.	1	1	2	1.0	6.4
83. Newburgh, N. Y.	1	0	1	1.1	6.2
84. St. Louis Park, Minn.	1	1	0	1.1	5.2
85. Fargo, N. D.	1	0	1	1.1	4.9
86. Coral Gables, Fla.	**1**	**2**	**3**	**1.1**	**6.8**
87. Arlington, Mass.	**1**	**1**	**0**	**1.0**	**4.2**
88. Alton, Ill.	**1**	**4**	**3**	**1.1**	**6.1**
89. Rome, N. Y.	1	0	0	1.2	4.2
90. Beloit, Wis.	1	0	1	1.2	6.3
91. Bloomington, Ind.	1	1	0	1.2	6.2
92. Barberton, Ohio	1	0	5	1.2	5.6
93. Rome, Ga.	1	1	2	1.2	6.2
94. Manchester, Conn.	1	0	1	1.2	5.0
95. Janesville, Wis.	1	1	2	1.2	6.3
96. Fairfield, Conn.	**1**	**7**	**3**	**1.2**	**4.8**
97. West Orange, N. J.	1	1	3	1.2	5.8
98. Bloomington, Ill.	1	0	0	1.3	5.5
99. Jackson, Tenn.	1	0	1	1.3	5.9
100. Maywood, Ill.	1	1	1	1.3	7.3
101. South Euclid, Ohio	**1**	**2**	**0**	**1.3**	**7.2**
102. Westfield, N. J.	1	0	1	1.3	7.7
103. Billings, Mont.	2	0	1	1.3	10.4
104. Bangor, Me.	1	0	0	1.4	5.0
105. Allen Park, Mich.	1	1	1	1.4	5.0
106. Hackensack, N. J.	**1**	**2**	**2**	**1.4**	**6.2**
107. Odessa, Tex.	2	2	1	1.4	9.0
108. Richfield, Minn.	1	1	1	1.4	5.7
109. Vallejo, Calif.	**2**	**5**	**1**	**1.4**	**9.1**
110. Petersburg, Va.	1	0	1	1.4	5.6
111. Teaneck, N. J.	1	1	3	1.4	5.2
112. **Florence, S. C.**	**1**	**3**	**1**	**1.4**	**7.0**
113. Greenville, Miss.	1	0	1	1.4	5.8
114. Benton Harbor, Mich.	1	1	2	1.5	7.8
115. Rahway, N. J.	1	1	1	1.5	7.4
116. Wyandotte, Mich.	2	0	1	1.5	8.1
117. Monclair, N. J.	1	0	1	1.5	4.5
All cities in this group				1.5	7.3
118. Brownsville, Tex.	1	1	4	1.6	5.4
119. Boise, Idaho	2	0	0	1.6	11.6
120. Burlington, N. C.	1	0	1	1.6	8.0
121. Clearwater, Fla.	2	2	4	1.7	13.7
122. Kokomo, Ind.	**2**	**4**	**3**	**1.7**	**8.8**
123. Grand Forks, N. D.	1	0	0	1.7	7.1
124. Lewiston, Maine	1	1	0	1.7	4.9
125. Fairmont, W. Va.	1	0	0	1.7	6.8
126. Pasadena, Tex.	2	1	2	1.7	8.4
127. Shaker Heights, Ohio	1	0	3	1.7	5.9
128. Elkhart, Ind.	2	0	1	1.8	10.3
129. Urbana, Ill.	1	0	0	1.8	7.6
130. Owensboro, Ky.	2	1	1	1.9	9.3
131. Elyria, Ohio	2	0	0	1.9	10.6
132. La Crosse, Wis.	2	2	1	2.0	8.4
133. Lawton, Okla.	**2**	**3**	**1**	**2.0**	**10.3**
134. Moline, Ill.	2	2	4	2.0	10.2
135. Aurora, Colo.	2	0	1	2.0	16.0
136. Oshkosh, Wis.	2	1	1	2.1	9.1
137. Sheboygan, Wis.	2	0	0	2.1	8.4
138. Bellingham, Wash.	2	0	2	2.1	10.9
139. Danville,, Va.	2	1	5	2.1	8.0
140. Tallahassee, Fla.	3	0	3	2.2	15.7
141. East Detroit, Mich.	2	1	0	2.2	9.3
142. Elmhurst, Ill.	2	1	1	2.3	11.5
143. East Cleveland, Ohio	2	1	1	2.4	9.9
144. Linden, N. J.	2	0	4	2.4	10.9
145. Roseville, Mich.	**2**	**4**	**1**	**2.4**	**9.6**
146. Elgin, Ill.	3	2	3	2.6	12.4
147. Burlington, Iowa	2	0	2	2.6	13.1
148. Fitchburg, Mass.	**2**	**3**	**0**	**2.8**	**9.3**
149. Spartanburg, S. C.	**3**	**5**	**1**	**2.8**	**14.4**
150. Manitowoc, Wis.	2	0	2	2.8	13.3
151. St. Cloud, Minn.	2	1	0	2.8	12.4
152. Hamtramck, Mich.	2	0	1	2.8	8.7
153. Daytona Beach, Fla.	3	2	3	2.9	16.6
154. Bristol, Conn.	2	0	0	2.9	8.8
155. Hagerstown, Md.	3	2	1	2.9	15.6
156. Enid, Okla.	3	1	0	3.0	16.1
157. Port Huron, Mich.	3	2	2	3.0	15.6
158. Iowa City, Iowa	2	0	0	3.0	14.7
159. Champaign, Ill.	3	1	2	3.1	12.4
160. Sumter, S. C.	2	1	1	3.1	15.9
161. Temple, Tex.	**2**	**3**	**1**	**3.1**	**13.3**
162. Garfield Hgts., Ohio	2	1	1	3.1	11.4
163. Muskogee, Okla.	3	1	2	3.2	16.1
164. Freeport, Ill.	2	0	1	3.2	15.6
165. Parkersburg, W. Va.	2	1	0	3.2	12.8
166. Concord, N. H.	2	2	1	3.2	13.4
167. Wyoming, Mich.	**3**	**5**	**2**	**3.5**	**14.0**
168. Santa Clara, Calif.	4	2	2	3.7	18.5
169. Hazel Park, Mich.	2	0	2	3.8	15.0
170. Oxnard, Calif.	4	3	2	4.0	23.3
171. Wauwatosa, Wis.	4	0	1	4.1	17.3
172. Livonia, Mich.	5	1	1	4.2	20.4
173. Watertown, N. Y.	3	0	1	4.3	16.8
174. **Fremont, Calif.**	**2**	**3**	**3**	**4.4**	**14.9**
175. New London, Conn.	3	1	2	4.6	19.2
176. Wineland, N. J.	4	3	3	4.6	24.2
177. Middletown, Ohio	5	1	3	4.7	22.6
178. Chula Vista, Calif.	5	1	1	4.8	28.1
179. Michigan City, Ind.	4	0	2	4.8	24.2
180. Monroe, Mich.	4	0	0	5.4	28.6
181. Revere, Mass.	3	2	3	5.5	15.2
182. High Point, N. C.	6	1	1	5.6	27.3
183. Highland Park, Ill.	3	2	0	5.7	23.8
184. Mishawaka, Ind.	5	0	0	6.0	29.3
185. Kettering, Ohio	4	0	0	6.1	16.5
186. Superior, Wis.	4	2	1	6.8	22.7
187. Southfield, Mich.	5	2	4	9.4	37.5

Group IX (10,000 to 25,000)

1. Boulder, Colo.	0	0	0	0.0	0.0
2. Mesa, Ariz.	**0**	**3**	**0**	**0.0**	**0.0**
3. Greeley, Colo.	**0**	**1**	**0**	**0.0**	**0.0**
4. Ft. Pierce, Fla.	0	7	2	0.0	0.0
5. Medford, Ore.	**0**	**1**	**0**	**0.0**	**0.0**
6. Orange, Calif.	**0**	**1**	**2**	**0.0**	**0.0**
7. Merced, Calif.	**0**	**2**	**1**	**0.0**	**0.0**
8. Los Altos, Calif.	**0**	**2**	**0**	**0.0**	**0.0**
9. Edina, Minn.	0	0	0	0.0	0.0
10. Longview, Wash.	**0**	**1**	**2**	**0.0**	**0.0**
11. Lodi, Calif.	0	0	1	0.0	0.0
12. Waukesha, Wis.	**0**	**2**	**0**	**0.0**	**0.0**
13. Port Chester, N. Y.	0	0	1	0.0	0.0
14. La Porte, Ind.	0	0	3	0.0	0.0
15. Bartlesville, Okla.	0	0	1	0.0	0.0
16. Bismarck, N. D.	**0**	**1**	**1**	**0.0**	**0.0**
17. Carlsbad, N. M.	**0**	**1**	**0**	**0.0**	**0.0**
18. Klamath Falls, Ore.	0	0	0	0.0	0.0
19. Lake Worth, Fla.	**0**	**1**	**0**	**0.0**	**0.0**
20. Sherman, Tex.	**0**	**1**	**0**	**0.0**	**0.0**
21. Butler, Pa.	0	0	0	0.0	0.0
22. Endicott, N. Y.	0	0	1	0.0	0.0
23. Ypsilanti, Mich.	0	0	1	0.0	0.0
24. Ames, Iowa	0	0	1	0.0	0.0
25. Frederick, Md.	0	0	0	0.0	0.0
26. El Cerrito, Calif.	0	0	1	0.0	0.0
27. Napa, Calif.	0	0	0	0.0	0.0
28. San Fernando, Calif.	**0**	**2**	**0**	**0.0**	**0.0**
29. North Miami, Fla.	**0**	**1**	**0**	**0.0**	**0.0**
30. Covina, Calif.	0	0	1	0.0	0.0
31. Great Bend, Kan.	0	0	1	0.0	0.0
32. Lombard, Ill.	0	0	0	0.0	0.0
33. Tiffin, Ohio	0	0	0	0.0	0.0
34. Uniontown, Pa.	0	0	1	0.0	0.0
35. Wilmette, Ill.	0	0	0	0.0	0.0
36. Jeffersonville, Ind.	**0**	**1**	**0**	**0.0**	**0.0**
37. North Platte, Neb.	0	0	0	0.0	0.0
38. Madison Hts., Mich.	**0**	**2**	**0**	**0.0**	**0.0**
39. Fremont, Ohio	**0**	**1**	**0**	**0.0**	**0.0**
40. Plainview, Tex.	**0**	**2**	**0**	**0.0**	**0.0**
41. Robbinsdale, Minn.	0	0	2	0.0	0.0
42. Salisbury, N. C.	0	0	1	0.0	0.0
43. Pittsburg, Kan.	0	0	0	0.0	0.0
44. Muscatine, Iowa	0	0	0	0.0	0.0
45. Glendora, Calif.	**0**	**3**	**0**	**0.0**	**0.0**
46. Muskegon Hts., Mich.	**0**	**1**	**0**	**0.0**	**0.0**
47. Hibbing, Minn.	0	0	0	0.0	0.0
48. Richland, Wash.	0	0	1	0.0	0.0
49. Emporia, Kan.	0	0	0	0.0	0.0
50. Niles, Mich.	**0**	**1**	**0**	**0.0**	**0.0**
51. Marietta, Ohio	0	0	1	0.0	0.0
52. Calumet City, Ill.	**0**	**5**	**1**	**0.0**	**0.0**
53. Wooster, Ohio	**0**	**2**	**1**	**0.0**	**0.0**
54. Johnson City, N. Y.	0	0	0	0.0	0.0
55. Moorhead, Minn.	**0**	**1**	**2**	**0.0**	**0.0**
56. Xenia, Ohio	**0**	**1**	**2**	**0.0**	**0.0**
57. Streator, Ill.	0	0	0	0.0	0.0
58. Connersville, Ind.	**0**	**1**	**0**	**0.0**	**0.0**
59. Huntington, Ind.	0	0	2	0.0	0.0
60. Snyder, Tex.	0	0	0	0.0	0.0
61. Las Cruces, N. M.	0	0	1	0.0	0.0
62. Elmwood Park, Ill.	0	0	0	0.0	0.0
63. Shorewood, Wis.	0	0	0	0.0	0.0
64. Pittsburg, Calif.	0	0	0	0.0	0.0
65. Ashland, Ohio	0	0	0	0.0	0.0
66. Greensburg, Pa.	0	0	0	0.0	0.0
67. Kennewick, Wash.	**0**	**4**	**0**	**0.0**	**0.0**
68. Mt. Vernon, Ill.	0	0	1	0.0	0.0
69. So. Milwaukee, Wis.	**0**	**1**	**0**	**0.0**	**0.0**
70. Statesville, N. C.	0	0	2	0.0	0.0
71. Tempe, Ariz.	**0**	**2**	**0**	**0.0**	**0.0**
72. Valparaiso, Ind.	0	0	0	0.0	0.0
73. El Dorado, Kan.	**0**	**1**	**0**	**0.0**	**0.0**
74. Brainerd, Minn.	**0**	**1**	**0**	**0.0**	**0.0**
75. Arkansas City, Ark.	**0**	**1**	**0**	**0.0**	**0.0**
76. Pendleton, Ore.	**0**	**1**	**0**	**0.0**	**0.0**
77. Escondido, Calif.	**0**	**1**	**0**	**0.0**	**0.0**
78. Marquette, Mich.	0	0	0	0.0	0.0
79. Pasco, Wash.	**0**	**1**	**0**	**0.0**	**0.0**
80. Villa Park, Ill.	0	0	0	0.0	0.0
81. Fostoria, Ohio	0	0	0	0.0	0.0
82. Redding, Calif.	0	0	1	0.0	0.0
83. Takoma Park, Md.	**0**	**1**	**0**	**0.0**	**0.0**
84. Defiance, Ohio	0	0	0	0.0	0.0
85. McAlester, Okla.	**0**	**1**	**0**	**0.0**	**0.0**
86. Alpena, Mich.	**0**	**2**	**0**	**0.0**	**0.0**
87. Massena, N. Y.	0	0	2	0.0	0.0
88. Brookfield, Ill.	0	0	0	0.0	0.0
89. Tracy, Calif.	0	0	0	0.0	0.0
90. Attleboro, Mass.	**0**	**4**	**1**	**0.0**	**0.0**
91. Owatonna, Minn.	0	0	0	0.0	0.0
92. Prescott, Ariz.	0	0	0	0.0	0.0
93. Wisconsin Rpds., Wis.	0	0	0	0.0	0.0
94. Rocky River, Ohio	0	0	0	0.0	0.0
95. Glenview, Ill.	0	0	1	0.0	0.0

	Six Months 1960	1959	1958	1960 Reg. Rate	1960 Pop. Rate
96. Needham, Mass.	**0**	**1**	**0**	**0.0**	**0.0**
97. The Dalles, Ore.	**0**	**1**	**0**	**0.0**	**0.0**
98. Boone, Iowa	**0**	**1**	**0**	**0.0**	**0.0**
99. Fergus Falls, Minn.	0	0	0	0.0	0.0
100. North Adams, Mass.	**0**	**1**	**0**	**0.0**	**0.0**
101. South Orange, N. J.	**0**	**1**	**1**	**0.0**	**0.0**
102. Astoria, Ore.	0	0	0	0.0	0.0
103. Winfield, Kan.	0	0	0	0.0	0.0
104. Kenmore, N. Y.	0	0	0	0.0	0.0
105. State College, Pa.	0	0	0	0.0	0.0
106. Mamaroneck, N. Y.	**0**	**1**	**0**	**0.0**	**0.0**
107. Waynesboro, Va.	0	0	0	0.0	0.0
108. Hawthorne, N. J.	0	0	0	0.0	0.0
109. Albany, Calif.	**0**	**1**	**1**	**0.0**	**0.0**
110. Lamesa, Tex.	**0**	**1**	**0**	**0.0**	**0.0**
111. Jennings, Mo.	0	0	0	0.0	0.0
112. Canton, Ill.	**0**	**1**	**0**	**0.0**	**0.0**
113. Martinsburg, W. Va.	0	0	0	0.0	0.0
114. Mitchell, S. D.	0	0	0	0.0	0.0
115. Beaver Dam, Wis.	0	0	0	0.0	0.0
116. Hopewell, Va.	0	0	0	0.0	0.0
117. Conneaut, Ohio	**0**	**1**	**0**	**0.0**	**0.0**
118. Galion, Ohio	0	0	0	0.0	0.0
119. Winnetka, Ill.	**0**	**1**	**0**	**0.0**	**0.0**
120. Menasha, Wis.	0	0	0	0.0	0.0
121. North Olmsted, Ohio	0	0	1	0.0	0.0
122. Mt. Pleasant, Mich.	0	0	1	0.0	0.0
123. Seaside, Calif.	0	0	0	0.0	0.0
124. Albion, Mich.	0	0	0	0.0	0.0
125. Van Wert, Ohio	0	0	0	0.0	0.0
126. Bellefontaine, Ohio	0	0	0	0.0	0.0
127. Elizabeth City, N. C.	**0**	**1**	**0**	**0.0**	**0.0**
128. Bowling Green, Ohio	0	0	1	0.0	0.0
129. Northbrook, Ill.	0	0	0	0.0	0.0
130. Suffolk, Va.	0	0	0	0.0	0.0
131. Hornell, N. Y.	0	0	0	0.0	0.0
132. Virginia, Minn.	0	0	0	0.0	0.0
133. Grosse Pt. Wds., Mich.	0	0	0	0.0	0.0
134. Du Bois, Pa.	**0**	**1**	**0**	**0.0**	**0.0**
135. Marinette, Wis.	**0**	**2**	**1**	**0.0**	**0.0**
136. Red Wing, Minn.	0	0	0	0.0	0.0
137. Bay Village, Ohio	0	0	1	0.0	0.0
138. Cudahy, Wis.	0	0	0	0.0	0.0
139. Pacific Grove, Calif.	0	0	0	0.0	0.0
140. Cadillac, Mich.	0	0	0	0.0	0.0
141. University Hts., Ohio	**0**	**1**	**0**	**0.0**	**0.0**
142. Charles City, Iowa	0	0	0	0.0	0.0
143. Cambridge, Md.	0	0	1	0.0	0.0
144. Fairfield, Calif.	0	0	0	0.0	0.0
145. Menominee, Mich.	0	0	1	0.0	0.0
146. Grosse Pte. Pk., Mich.	0	0	0	0.0	0.0
147. Henderson, N. C.	0	0	2	0.0	0.0
148. Covington, Va.	0	0	0	0.0	0.0
149. Dyersburg, Tenn.	**0**	**2**	**1**	**0.0**	**0.0**
150. Ironwood, Mich.	0	0	0	0.0	0.0
151. Maumee, Ohio	0	0	0	0.0	0.0
152. Los Alamos, N. M.	**0**	**2**	**0**	**0.0**	**0.0**
153. Moscow, Idaho	0	0	0	0.0	0.0
154. Monroe, N. C.	**0**	**1**	**1**	**0.0**	**0.0**
155. Bellaire, Ohio	0	0	1	0.0	0.0
156. Webster, Mass.	0	0	0	0.0	0.0
157. Fairfield, Ala.	0	0	0	0.0	0.0
158. Mercedes, Tex.	0	0	0	0.0	0.0
159. Donora, Pa.	0	0	0	0.0	0.0
160. Rolling Meadows, Ill.	0	0	0	0.0	0.0
161. Englewood, Colo.	1	0	0	1.1	8.8
162. Santa Cruz, Calif.	1	0	3	1.2	8.8
163. Grand Island, Neb.	1	1	1	1.3	8.0
All cities in this group				1.3	7.0
164. Fort Myers, Fla.	1	1	0	1.4	11.3
165. Austin, Minn.	1	0	0	1.4	8.2
166. Ponca City, Okla.	1	0	0	1.4	8.7
167. Garland, Tex.	**1**	**3**	**1**	**1.4**	**9.0**
168. Lawrence, Kan.	1	0	1	1.4	8.5
169. Adrian, Mich.	1	0	1	1.6	8.3
170. Pampa, Tex.	1	0	0	1.6	10.5
171. Ocala, Fla.	1	0	2	1.7	14.0
172. Kingsport, Tenn.	1	0	0	1.7	8.2
173. Lufkin, Tex.	1	1	2	1.8	11.5
174. Kinston, N. C.	1	0	1	1.8	8.8
175. Corvallis, Ore.	1	0	0	1.8	10.8
176. Manhattan, Kan.	1	0	0	1.8	10.5
177. Wheaton, Ill.	1	0	1	1.8	8.5
178. Renton, Wash.	1	0	1	1.8	11.8
179. Ottawa, Ill.	1	1	2	1.9	10.3
180. Aberdeen, S. D.	1	1	2	1.9	9.0
181. Denison, Tex.	**1**	**2**	**2**	**1.9**	**9.6**

TRAFFIC DEATHS—STATE RECORDS

Deaths are reported by state traffic authorities.

All figures are preliminary. To insure proper comparisons, 1959 and 1958 figures cover the same reporting period as those for 1960.

Population Rate: U. S. population rate is the estimated annual number of deaths per 100,000 population, assuming that deaths for the rest of the year will follow the normal seasonal pattern. State population rate is the estimated annual number of deaths per 100,000 population, assuming that the monthly average of deaths will remain at the present average for the rest of the year. Population rates are based on July 1, 1959, population estimates, U. S. Bureau of the Census, Washington, D. C.

States shown in heavy type have improved in 1960 compared with 1959, or showed no change.

Mileage Rate: The number of deaths per 100 million vehicle miles of travel.

(Figures in parenthesis following the 1960 mileage rate indicate the number of months for which the mileage rate is calculated for each state.)

	Months Reported	Deaths Identical Periods 1960	1959	1958	% Change 1959 to 1960	% Change 1958 to 1960	1960 Pop. Rate	1960 Mile. Rate	
TOTAL U.S.	6	17,090	17,100	16,315	0%	+ 5%	21.0	5.0	(6)
Ala.	**6**	**400**	**401**	**378**	**— *%**	**+ 6%**	**25.1**	**5.3**	**(4)**
Alaska	5	16	8	9	+100%	+ 78%	16.8	—	—
Ariz.	**6**	**226**	**277**	**230**	**— 18%**	**— 2%**	**36.7**	**6.8**	**(5)**
Ark.	**6**	**178**	**208**	**182**	**— 14%**	**— 2%**	**20.4**	**5.4**	**(5)**
Calif.	6	1,714	1,667	1,571	+ 3%	+ 9%	23.4	4.9	(4)
Colo.	6	188	177	161	+ 6%	+ 17%	22.4	5.7	(1)
Conn.	**6**	**101**	**118**	**87**	**— 15%**	**+ 16%**	**8.4**	**2.2**	**(5)**
Del.	**6**	**35**	**35**	**36**	**0%**	**— 3%**	**15.4**	**3.1**	**(5)**
D. of C.	6	43	33	26	+ 30%	+ 65%	10.2	3.6	(4)
Fla.	6	614	532	550	+ 15%	+ 12%	25.8	6.0	(5)
Ga.	6	466	451	416	+ 3%	+ 12%	24.3	5.9	(5)
Hawaii	5	40	33	—	+ 21%	—	14.6	—	—
Idaho	6	105	101	108	+ 4%	— 3%	31.6	5.9	(4)
Ill.	**6**	**726**	**774**	**802**	**— 6%**	**— 9%**	**14.2**	**3.5**	**(4)**
Ind.	6	484	473	425	+ 2%	+ 14%	20.9	4.4	(4)
Ia.	**6**	**246**	**307**	**256**	**— 20%**	**— 4%**	**17.5**	**4.4**	**(4)**
Kan.	**6**	**232**	**259**	**223**	**— 10%**	**+ 4%**	**21.7**	**3.8**	**(4)**
Ky.	**6**	**340**	**350**	**356**	**— 3%**	**— 5%**	**21.8**	**6.2**	**(4)**
La.	6	405	309	411	+ 31%	— 1%	25.6	7.2	(5)
Maine	**6**	**60**	**62**	**59**	**— 3%**	**+ 2%**	**12.6**	**3.5**	**(4)**
Md.	6	269	250	250	+ 8%	+ 8%	17.7	5.1	(4)
Mass.	6	255	242	253	+ 5%	+ 1%	10.3	2.8	(4)
Mich.	6	626	575	545	+ 9%	+ 15%	15.7	4.0	(4)
Minn.	6	274	273	309	+ *%	— 11%	16.1	3.4	(4)
Miss.	6	308	239	224	+ 29%	+ 38%	28.2	7.7	(5)
Mo.	6	451	401	397	+ 12%	+ 14%	21.3	5.0	(4)
Mont.	**6**	**84**	**102**	**82**	**— 18%**	**+ 2%**	**24.5**	**4.7**	**(4)**
Neb.	**6**	**112**	**146**	**145**	**— 23%**	**— 23%**	**15.4**	**3.4**	**(5)**
Nev.	**6**	**71**	**77**	**55**	**— 8%**	**+ 29%**	**50.7**	**7.8**	**(4)**
N. H.	**6**	**42**	**61**	**34**	**— 31%**	**+ 24%**	**14.2**	**3.3**	**(5)**
N. J.	6	354	332	346	+ 7%	+ 2%	11.9	2.8	(5)
N. M.	6	188	220	162	— 15%	+ 16%	42.8	7.8	(3)
N. Y.	6	866	955	960	— 9%	— 10%	10.5	3.8	(5)
N. C.	6	540	544	433	— 1%	+ 25%	23.8	6.1	(4)
N. D.	6	69	83	70	— 17%	— 1%	21.5	7.3	(5)
Ohio	6	859	753	815	+ 14%	+ 5%	17.7	—	—
Okla.	6	288	300	311	— 4%	— 7%	25.3	4.2	(3)
Ore.	6	168	202	176	— 17%	— 5%	19.0	4.4	(5)
Pa.	6	731	752	735	— 3%	— 1%	13.0	3.6	(4)
R. I.	6	26	37	35	— 30%	— 26%	5.9	1.7	(4)
S. C.	6	338	289	256	+ 17%	+ 32%	28.0	7.3	(4)
S. D.	**6**	**91**	**92**	**101**	**— 1%**	**— 10%**	**26.5**	**3.8**	**(5)**
Tenn.	6	356	326	322	+ 9%	+ 11%	20.3	5.0	(4)
Tex.	**6**	**1,010**	**1,097**	**1,008**	**— 8%**	**+ *%**	**21.2**	**4.3**	**(4)**
Utah	6	109	84	86	+ 30%	+ 27%	24.8	5.1	(4)
Vt.	**6**	**33**	**42**	**27**	**— 21%**	**+ 22%**	**17.7**	**5.2**	**(5)**
Va.	**6**	**352**	**372**	**376**	**— 5%**	**— 6%**	**17.6**	**4.4**	**(5)**
Wash.	6	238	235	243	+ 1%	— 2%	16.9	4.3	(4)
W. Va.	**6**	**152**	**203**	**152**	**— 25%**	**0%**	**15.5**	**5.2**	**(4)**
Wis.	**6**	**347**	**351**	**346**	**— 1%**	**+ *%**	**17.3**	**4.5**	**(4)**
Wyo.	6	68	59	60	+ 15%	+ 13%	42.6	6.3	(5)
P. R.‡	6	187	122	148	+ 53%	+ 26%	16.1	15.3	(4)
V. I.†	5	3	3	2	0%	+ 50%	25.9	—	—
CANADIAN PROVINCES									
Alta.	5	87	77	87	+ 13%	0%	18.0	—	—
B. C.	4	75	69	70	+ 9%	+ 7%	15.1	—	—
Man.	5	29	42	30	— 31%	— 3%	8.1	—	—
Sask.	6	51	57	57	— 11%	— 11%	11.6	—	—

*Less than .5%
‡Commonwealth of Puerto Rico
†Virgin Islands

	Six Months 1960	1959	1958	1960 Reg. Rate	1960 Pop. Rate
182. Owosso, Mich.	1	0	0	1.9	10.1
183. Sedalia, Mo.	1	1	0	1.9	9.4
184. Morristown, N. J.	1	0	0	1.9	11.3
185. Cranford, N. J.	1	1	0	1.9	8.7
186. Holland, Mich.	1	0	2	1.9	10.3
187. Brownwood, Tex.	**1**	**2**	**0**	**1.9**	**9.9**
188. Ada, Okla.	1	0	0	2.0	12.5
189. Texarkana, Ark.	1	1	1	2.0	10.2
190. Cape Girardeau, Mo.	1	0	0	2.0	9.1
191. So. Portland, Maine	1	0	1	2.0	8.2
192. Oceanside, Calif.	**1**	**2**	**3**	**2.0**	**9.8**
193. Meadville, Pa.	1	0	0	2.1	10.5
194. Hollywood, Fla.	**2**	**4**	**1**	**2.1**	**17.5**
195. Greenville, Tex.	1	1	0	2.1	12.9
196. Hillside, N. J.	1	0	0	2.2	9.5
197. Berkley, Mich.	**1**	**2**	**0**	**2.2**	**8.7**
198. Fairborn, Ohio	1	0	0	2.2	11.5
199. Stillwater, Okla.	1	0	1	2.2	9.9
200. Oswego, N. Y.	1	0	0	2.2	8.8
201. Caldwell, Idaho	**1**	**2**	**0**	**2.3**	**17.1**
202. New Bern, N. C.	1	1	1	2.3	10.7
203. Peru, Ind.	**1**	**3**	**0**	**2.3**	**13.2**
204. Woodland, Calif.	1	1	0	2.3	17.2
205. Newton, Kan.	1	0	1	2.4	15.2
206. Sterling, Ill.	1	1	0	2.4	13.2
207. Greenwood, Miss.	1	1	0	2.4	10.4
208. Antioch, Calif.	1	0	1	2.4	12.9
209. Collingswood, N. J.	1	1	0	2.4	11.1
210. Stevens Point, Wis.	1	0	0	2.4	11.4
211. La Grange, Ill.	1	0	0	2.4	13.6
212. Niles, Ohio	**1**	**3**	**0**	**2.4**	**10.3**
213. De Kalb, Ill.	1	0	0	2.5	12.7
214. East Moline, Ill.	1	1	0	2.5	13.1
215. La Mesa, Calif.	2	1	0	2.5	17.0
216. Livermore, Calif.	1	0	0	2.5	15.9
217. Santa Paula, Calif.	1	0	1	2.5	16.4
218. Vernon, Tex.	1	1	0	2.5	15.7
219. Salinas, Calif.	2	0	2	2.6	19.0
220. Highland Park, Tex.	1	0	1	2.6	16.4
221. Norfolk, Neb.	1	0	0	2.6	15.7
222. Port Angeles, Wash.	1	0	0	2.7	17.1
223. Hanford, Calif.	1	0	0	2.7	20.0
224. Sault Ste. Marie, Mich.	1	1	1	2.7	10.2
225. Watertown, Wis.	1	0	0	2.7	15.4
226. Lexington, N. C.	1	0	1	2.8	13.9
227. Marshfield, Wis.	1	0	3	2.9	14.7
228. Coronado, Calif.	**1**	**2**	**4**	**2.9**	**10.6**
229. St. Joseph, Mich.	1	0	0	2.9	15.3
230. Millbrae, Calif.	1	0	1	2.9	12.7
231. Atchison, Kan.	1	0	1	2.9	15.6
232. Gardner, Mass.	1	0	1	3.0	10.0
233. Plymouth, Mich.	1	0	0	3.1	18.3
234. River Forest, Ill.	1	1	0	3.5	18.5
235. River Rouge, Mich.	**1**	**2**	**0**	**3.5**	**9.4**
236. Rock Springs, Wyo.	1	0	0	3.6	17.2
237. W. Springfield, Mass.	**2**	**3**	**3**	**3.6**	**17.5**
238. Two Rivers, Wis.	1	1	0	3.7	17.4
239. Monterey, Calif.	2	0	1	3.8	18.3
240. Stoughton, Mass.	1	0	1	3.8	14.5
241. Westlake, Ohio	1	1	1	3.9	18.7
242. Auburn, Mass.	1	0	0	4.0	16.1
243. Ridgefield Pk., N. J.	1	0	0	4.1	14.3
244. La Salle, Ill.	1	0	0	4.2	16.5
245. Beacon, N. Y.	1	0	1	4.3	13.3
246. Ashland, Wis.	1	0	1	4.7	18.9
247. Bell, Calif.	3	1	0	4.8	32.6
248. Corona, Calif.	2	2	0	4.8	31.5
249. Goshen, Ind.	2	1	0	5.1	30.3
250. Bristol, Va.	2	0	0	5.1	22.3
251. Victoria, Tex.	4	0	0	5.6	35.7
252. Griffin, Ga.	2	0	0	5.6	28.6
253. Escanaba, Mich.	2	0	0	5.8	26.3
254. Cedar Falls, Iowa	3	0	0	6.1	33.5
255. Leominster, Mass.	3	1	1	6.5	24.2
256. Dover, Ohio	2	0	2	6.7	37.0
257. Circleville, Ohio	2	0	0	6.9	38.1
258. Homewood, Ala.	2	1	1	7.1	22.2
259. Ecorse, Mich.	2	0	0	7.5	21.6
260. Goldsboro, N. C.	4	3	2	7.6	37.2
261. Fort Thomas, Ky.	2	0	0	7.7	23.3
262. Pompano Beach, Fla.	3	0	0	7.7	30.0
263. West Lafayette, Ind.	**2**	**3**	**1**	**7.8**	**30.5**
264. Yuma, Ariz.	4	0	0	8.0	63.0
265. Brawley, Calif.	3	0	2	8.8	44.8
266. North Chicago, Ill.	3	0	3	11.3	33.3
267. Hays, Kan.	4	0	0	12.3	80.0
268. Bloomington, Minn.	6	0	3	14.9	95.2
269. Reidsville, N. C.	5	0	0	17.5	85.5
CANADIAN CITIES					
Toronto, Ont.	47	36	69	—	6.3
Vancouver, B. C.	14	13	16	—	7.0
Montreal, Que.	53	53	45	—	9.6
Hamilton, Ont.	13	10	11	—	10.7

MOTOR VEHICLE DEATHS AND INJURIES BY STATES 1960 and 1959

Forty states and the District of Columbia have reported their death and injury experience for one to five months of 1960.

The table below shows all of the injury data reported by each state, but little information is available on precisely what injuries are included in each state's tabulation.

Differences in the ratio of injuries to deaths probably reflect primarily differences in the extent to which all injuries are reported. Other factors are undoubtedly involved, such as: (1) a few states omit some or all of the injuries in urban accidents; (2) there are large differences between states in the proportion of travel which is in urban area (the injury-death ratio for urban accidents is about four times the ratio for rural accidents).

The question of what injuries are being reported applies with equal force to the per cent change in injuries from 1959 to 1960. Any tightening up of police administration, any emphasis on "get all the injuries" is almost certain to bring about an increase in reported injuries, but probably only in minor ones. Similarly, instructions to "skip the scratches" probably would result in a decrease in recorded cases in many states. Introduction of financial responsibility laws has been observed to increase reported injuries sharply. Even the public's increased claims-consciousness is regarded by many people as an element in the growing number of injuries reported. With such factors operating to destroy comparability, indicated changes in the number of injuries should not be considered as reliable.

	Months Reported	Deaths†† 1960	Deaths†† 1959	Injuries†† 1960	Injuries†† 1959	% Change 1959 to 1960 Deaths	% Change 1959 to 1960 Injuries	1960 Ratio of Injuries to Deaths
TOTAL U.S.	**	9,263#	9,247#	386,699	368,843	+ *#	+ 5	42
Ala.	5	294	332	1,843†	1,867†	— 11	— 1	6
Ariz.								
Ark.	5	147	151	1,348	1,284	— 3	+ 5	9
Calif.	4	1,079	1,075	47,165	45,051	+ *	+ 5	44
Colo.								
Conn.	2	32	41	3,329	3,281	— 22	+ 1	104
Del.	5	27	25	985	1,025	+ 8	— 4	36
D. of C.	5	35	30	3,156	3,041	+ 17	+ 4	90
Fla.	5	527	451	19,540	17,294	+ 17	+ 13	37
Ga.	5	393	377	7,068	6,979	+ 4	+ 1	18
Idaho	4	55	65	1,227	1,418	— 15	— 13	22
Ill.	4	435	456	27,999	29,112	— 5	— 4	64
Ind.	1	80	76	2,621	2,775	+ 5	— 6	33
Iowa								
Kan.	2	54	70	2,302	2,207	— 23	+ 4	43
Ky.	5	273	284	5,702	5,864	— 4	— 3	21
La.	5	322	278	3,157†	3,440†	+ 16	— 8	10
Maine	5	51	51	2,369	2,146	0	+ 10	46
Md.	5	117	122	5,007	4,387	— 4	+ 14	43
Mass.								
Mich.	5	501	453	32,984	21,629	+ 11	+ 52	66
Minn.	5	220	224	10,737	9,796	— 2	+ 10	49
Miss.	3	150	131	1,722	1,654	+ 15	+ 4	11
Mo.	5	373	330	4,555	4,211	+ 13	+ 8	12
Mont.	3	31	33	738	516	— 6	+ 43	24
Neb.	1	25	24	912	733	+ 4	+ 24	36
Nev.								
N. H.	5	29	52	2,228	2,209	— 44	+ 1	77
N. J.	2	124	108	9,825	8,825	+ 15	+ 11	79
N. M.	4	129	131	1,796	1,487	— 2	+ 21	14
N. Y.	4	529	612	81,121	82,300	— 14	— 1	153
N. C.	5	436	466	10,140	9,121	— 6	+ 11	23
N. D.	3	20	25	425	501	— 20	— 15	21
Ohio	5	708	601	31,296	28,642	+ 18	+ 9	44
Okla.	1	41	41	1,308	1,190	0	+ 10	32
Ore.	5	135	177	6,517	6,877	— 24	— 5	48
Pa.								
R. I.								
S. C.	5	276	229	4,822	3,647	+ 21	+ 32	17
S. D.	4	43	54	957	—	— 20	—	22
Tenn.	4	220	197	5,912	4,768	+ 12	+ 24	27
Texas	5	830	919	23,215	28,875	— 10	— 20	28
Utah	4	62	43	2,564	1,612	+ 44	+ 59	41
Vt.	5	31	32	955	1,122	— 3	— 15	31
Va.	3	147	179	5,385	5,285	— 18	+ 2	37
Wash.	4	153	153	8,954	8,998	0	— *	59
W. Va.	5	124	159	2,756	2,832	— 22	— 3	22
Wis.								
Wyo.	5	48	44	1,029	842	+ 9	+ 22	21
P. R.‡	4	125	83	4,239	3,753	+ 51	+ 13	34
V. I.¶	5	3	3	93	65	0	+ 43	31

†Rural injuries only.

††All figures are preliminary. To insure proper comparisons, 1959 figures cover the same reporting period as those for 1960.

*Less than .5%.

**Death and injury totals cover reports for all months indicated in this column.

#Death totals and changes differ from national figures because those shown here are based on the states and months for which injury data are reported.

‡Commonwealth of Puerto Rico.

¶Virgin Islands.

Library

From Page 4

One of Every Three Driver Applicants Fail New, Strict Driver Examination. *Chicago Traffic Safety Review,* May, 1960, p. 1 & 4.

Physical Examination of Drivers in Pennsylvania. David L. Lawrence. *Traffic Digest and Review,* June, 1960, p. 17-18.

(Beginning in June 1960 the state of Pennsylvania required a health certificate as a prerequisite for a license.)

Problems of the Older Driver—A Pilot Study. William A. Mann. *MSU Center Letter,* May, 1960, p. 3.

(Some statements regarding study at Michigan State University on the results of test given older drivers.)

Utility Fleet Tests Drivers Without Road Hazards. *Commercial Car Journal,* June, 1960, p. 108-109.

("Drivotrainer" used as part of a refresher course.)

When the Devil's in the Driver's Seat. John A. Kirstein. *Presbyterian Survey,* July, 1960, p. 14-15, 30.

With Dignity and Decency: A Car's Behavior is Determined by the Individual Driving It. The Rev. Dr. L. R. Elson. *Highway Highlights,* May-June, 1960, p. 15, 39.

(Taken from Dr. Elson's address at the Eighth Highway Transportation Congress.)

Engineering

Objectives of Engineering in Traffic Safety. George W. Barton. *Traffic Digest and Review,* June, 1960, p. 7-10, 30-33.

(Skillful planning by trained specialists can play a significant role in the reduction of accidents.)

Highways

The Illinois Tollway. William F. Bauch. *Traffic Engineering,* June, 1960, p. 11-13, 43.

Lessons for Drivers in Expressway Mishaps. *Cook County Highways,* June, 1960, p. 3 & 6.

Inspection

Safety-check your Car. *Changing Times,* June, 1960, p. 45-46.

Lighting

More Cars and Light—Fewer Deaths. Ben West and E. E. Parks. *The American City,* July, 1960, p. 104-105.

(Good lighting has reduced night accidents from 40 per cent to 29 per cent in Nashville, Tenn.)

Police

Evaluating Performance of State Highway Patrolmen. Kenneth R. Hammond. *Traffic Digest and Review,* June, 1950, p. 4-6, 28-29.

(Research conducted by behavior scientists suggests a criterion for measuring the quality of traffic law enforcement activity.)

Programs

District of Columbia Official Traffic Safety Program, 1960. 32pp. Traffic Coordinating Committee, District of Columbia, Room 514, District Building, Washington 4, D. C.

We can Death-Proof our Highways. Abe Ribicoff. *Mechanix Illustrated,* July, 1960, p. 59-61, 158.

(The highway safety program of Connecticut as told by its governor.)

Regulations

Digest of Motor Laws, 1960, 27th ed. 165pp. American Automobile Association, Washington 6, D. C.

Signs and Signals

Our Traffic Sign Mess. A. R. Roalman. *Today's Health,* July, 1960, p. 52-55.

Speed

Semi-Annual Speed Studies. May, 1960. 34pp. Arizona Highway Department, Traffic Engineering Division, Phoenix, Ariz.

Traffic

Dictionary of Highway Traffic. J. Stannard Baker & William R. Stebbins, Jr. 1960. 304pp. Traffic Institute, Northwestern University, 1804 Hinman Ave., Evanston, Ill. Price $6.00.

(Approximately 10,000 terms are discussed including basic vocabulary, analogous terms, synonyms, antonyms, etc. This volume also shows the essential differences and similarities among the terms currently being used in the various technical specialties concerned with traffic and traffic safety. Will be a very valuable tool, not only for the traffic engineer, but anyone working in any phase of highway traffic.)

Women

Womanpower for Traffic Safety. ASF Report, No. 7. April, 1960. p. 1-8. Automotive Safety Foundation, 200 Ring Bldg., Washington 6, D. C.

(An analysis of women's activities in traffic safety prepared by Mrs. B. V. Todd, director, Women's Division and H. Wayne Kennedy, public relations division.)

ADDRESSES OF MAGAZINES MENTIONED

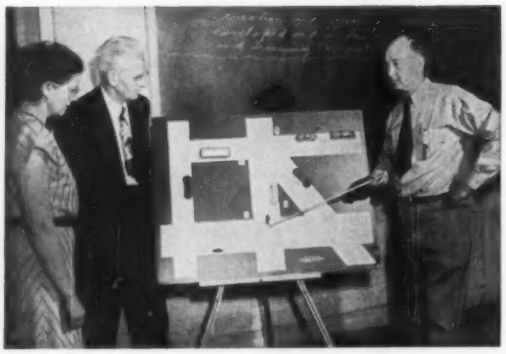
American Bicyclist and Motorcyclist
461 Eighth Ave.
New York 1, N. Y.

The American City
470 Fourth Ave.
New York 16, N. Y.

Changing Times
1729 H St., N. W.
Washington 6, D. C.

Chicago Traffic Safety Review
20 N. Wacker Dr.
Chicago 6, Ill.

Commercial Car Journal
Chestnut & 56th Sts.
Philadelphia, Pa.



THE "EYES" HAVE IT . . . .

Here is an aid that has proven practical in teaching visually the principles of safety. It's simple, effective and works wonders in teaching your drivers.

The MAGNO SAF-T BOARD is the result of studies by outstanding safety instructors and engineers. Safety directors, traffic managers, driving instructors, insurance agents and adjusters get a clear picture of how accidents occurred visually by reconstruction of conditions.

It is now being used from coast to coast by fleet owners, insurance and public utility companies, colleges and schools, and many other concerns interested in public safety. Consisting of a BOARD with typical street intersections on one side. The other side is a BLACKBOARD on which any street or road situation can be drawn with chalk and then erased. It has scale models of vehicles, traffic markers and accessories that can be placed in any conceivable traffic situation.

Write for our folder. It contains full information.

MAGNO SAF-T BOARD© EMIGSVILLE, PA.

Circle Item No. 3—Reader Service Card

Cook County Highways
130 N. Wells St.
Chicago 6, Ill.
Firemen
60 Batterymarch St.
Boston 10, Mass.
Highway Highlights
National Press Bldg.
Washington 4, D. C.
Highway Traffic Magazine
601-3 Republic Bldg.
Louisville 2, Ky.
MSU Center Letter
Michigan State University
East Lansing, Mich.
Mechanix Illustrated
612 N. Michigan Ave.
Chicago, Ill.
Mutual Insurance Bulletin
2105 N. Meridan St.
Indianapolis, Ind.
Presbyterian Survey
P. O. Box 1176
Richmond 9, Va.
Today's Health
535 N. Dearborn
Chicago 10, Ill.
Traffic Digest & Review
Traffic Institute
Northwestern University
1804 Hinman Ave.
Evanston, Ill.
Traffic Engineering
2029 K St., N. W.
Washington 6, D. C.

Book Review

Practical Police Knowledge by Capt. Juby E. Towler. 206 pages. Published by Charles C. Thomas, Springfield, Ill.

Long experience gained from police work at its different levels, augmented by administrative duties in personnel and training have ably qualified the author to cover the subject.

Certainly any person contemplating entry into police service will get from this book a good idea of the day-to-day activities and problems to be met in this field. Policemen already serving can benefit from study of its contents and from reference to it when seeking answers to new problems.

The author's stress on being "part of the team" is a good approach. The chapters on Public Service, Education, and Sell Law Enforcement are very good and timely. The book is well written, and is simple and easy to understand. It should provide a distinct contribution to professionalization of the police service.

—Daniel G. Reynolds, director, NSC traffic division

Association Institutes New Fleet Safety Service

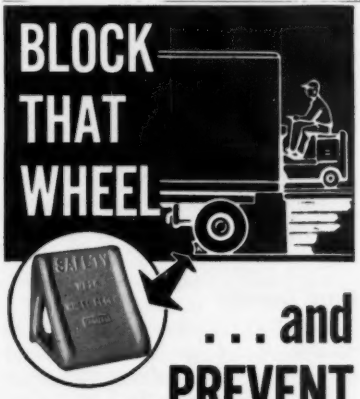
A new accident analysis service has been instituted by the accident prevention department of the Association of Casualty and Surety Companies as a safety aid to fleet operators.

Dealing exclusively with accident investigation reports from the Interstate Commerce Commission, the service consists of brief but detailed analyses of major accidents involving interstate motor carriers.

Each accident digest is a carefully prepared summary of the official investigation report of the ICC, the Association said. It outlines the circumstances and results of the accident, relates the causes as determined by investigators, and contains recommendations aimed at preventing recurrences.

"It is the objective of this service to better enable fleet safety engineers of stock companies which are members of this association to educate fleet owners and operators in the hazards involved in truck and bus operations on the public highways," the Association said.

BLOCK THAT WHEEL



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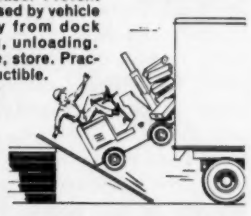

$12.35 ea. 1-5 Blocks
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Order now for immediate delivery! Write for illustrated catalog.

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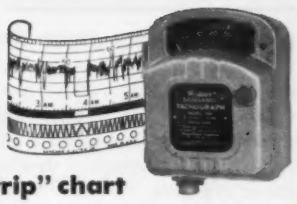
Circle Item No. 13—Reader Service Card

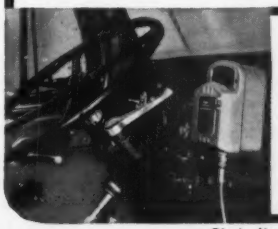
NEWS FOR TRUCK OWNERS...

NEW WAGNER-SANGAMO
TACHOGRAPH
for EXTENDED RECORDING of truck operation... up to 31 DAYS on single "strip" chart



This new model Tachograph, when installed on the dash of each of your trucks, graphically records all starts, stops, idling time, and speeds encountered on each run. Facts are permanently recorded on strip-type charts designed for 8, 15, or a maximum of 31 days continuous recording.

Data recorded on chart helps you plan better routes, eliminate unscheduled stops, and reduce operating costs . . . For details, mail the coupon.



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We operate_____ (Number) Vehicles W560-2

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The most modern laboratory for testing and training today's drivers. Includes all *SEVEN* important psychophysical tests.

Driverlab

Tests for reaction time, visual acuity, depth perception, color vision, field of vision, glare resistance and night blindness. *LESS* testing time is required. Its separate units can test up to *FOUR* persons at one time.

Driverlab

The most versatile equipment on the market for continuous and/or multiple testing in community or organizational driver programs. Being portable its quick to set up and easy to use. Examinees receive their own reaction time chart and individual score sheet showing test results.

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is a pioneer in testing devices and is used universally by all types of organizations in their safety programs. A twelve year research and development period has made it the most efficient and accepted testing equipment available.

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Lowest priced on market. FOB factory. Additional information is available on DRIVERLAB and other educational products upon request.

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Circle Item No. 5—Reader Service Card

Dade County

From Page 33

and touching the ground. Extra penalties were attached to the score for bypassing a ball or for hitting it.

The course in the finals and grand finals was set up according to the American Trucking Association Road-E-O Rules. This was the day when huge trucks, pickups and the smaller sedans maneuvered endlessly through a maze of barriers, stanchions, cones and balls. It was here that a driver had to be constantly on guard, aware of any lost time and infuriating mistakes.

Takes Skill

The obstacles included in all the eliminations were incorporated in the finals. Leaving the point of departure the contestant had to move forward to a barrier and then back up through an offset alley. Following this event the unit had to serpentine backward and forward between traffic cones. The contestant then circled the course and backed into an alley dock, pulled out and passed the right side tires between an array of balls only four inches wider than the tires. The course had to be circled again and the vehicle parallel parked. The last obstacle was a diminishing alley, wider at the beginning and tapered at the end. This was the home stretch where the driver looked back at what should have been done. The finish line was painted on the ground, and the contestant had to stop just in front of it for measurements. Demerits were attached for speeding, failure to follow instructions, hitting obstacles, improper movements and anything short of running out of gas. All the contestants were notified a week in advance of scoring procedures so no doubts would exist on the big day.

The motorcycle finals included the officers competing in the last-man-to-the-line event and the execution of left and right dips and left and right turns around automobile tires. At the end of this event was a plank raised six inches off the ground. After the left and right dips the contestant had to go off the plank and enter the 22 foot circle. When the left and right turns were completed he had to leave the plank and proceed through an "L" shaped alley slightly wider than the handlebars. Just ahead of the finish line was a teeter board. The motorcycle had to be stopped on the teeter board and the board had to be balanced. Ten merits were awarded to the individual who managed to balance the board. The champion of the 1959 Road-E-O won by nine points because he was the only one able to stop atop the board.

The awards were issued at the County Commission Chambers in the County Court House on May 24, 1960. Metropolitan Dade County placed first in the sedan, light truck and motorcycle and second place in the heavy truck division. Miami Beach was first in the waste truck and second in heavy truck and sedan. The City of Miami placed first in heavy truck and second in the motorcycle division. Hialeah placed second in the light truck competitions. All of the contestants who placed first, second or third in the finals were awarded prizes. Also, first and second place winners in the grand finals received numerous gifts. Prizes included, pen and pencil sets, safety shoes, gift certificates, rugs, watches and trophies.

Extra Benefits

Road-E-O time was not all work to the members of the personnel staff and the committees. There was the opportunity to make new friends and of being part of a project that will foster better driving habits. It was people like Bill Brown of Neway Uniforms, Bill Smith of Thom McAn's Safety Shoe Division and Miami's notable Harry Rich. It was the assistance of Met Stores, Bituminous Casualty Corp. and Major Rook of Florida's National Guard Armory all helping to make the event a success. It was the department heads, the carpenters, sign men and laborers. It was people thinking together and planning together and acting together, all helping to make the great advances in traffic safety possible.

NEW... SAFETY EQUIPMENT

Publication of product announcements in this section should not be construed as endorsement or approval by the National Safety Council.

Telescoping Maintenance Tower

Outdoor and indoor fluorescent fixtures are maintained from a single telescoping aluminum tower quickly and easily installed and removed from a service truck of Fluorescent Service Corp., Tampa, Florida. This telescoping tower, known as Tallescope, reduces parking lot fixture maintenance to a one-man operation. Quickly removed and equipped with locking casters for in-plant maintenance, the tower releases the truck from prolonged tie-ups previously experienced with ladder rigs. The tower telescopes for working at heights up to 32 feet.

Up-Right Scaffolds, 1013 Pardee, Berkeley, California (Item 41)

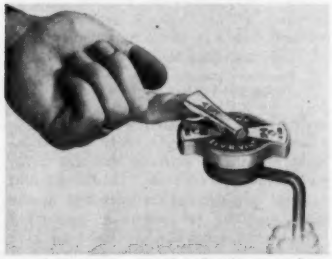
Steel Locking Device

One of the major causes of truck down time and fire loss is said to be virtually eliminated by the application of a simple stainless steel locking device.

On a series of tests run on trucks, the valve stem locks eliminated fire caused by running flats.

The installation of the lock is simple and does not require tools. The locks are designed for close wheel and drum conditions, and can be installed without removing either tire or wheel.

Carlan Instruments Co., Inc., 1375 Park Ave., Cranston, R. I. (Item 42)



Radiator Pressure Cap

The Lev-R-Vent safety radiator pressure cap is said to insure against scalds and burns of arms and hands when removing the cap of a boiling radiator. Lift the lever . . . it stays up . . . steam and heat jet away . . . through the radiator overflow tube. The blow-down operation carries on while the service man performs other duties about the vehicle. When the cap is turned to remove, the lever snaps down at a touch. An assortment of eight caps serve most 1948-1960 passenger cars, many trucks and some tractors.

Stant Mfg. Co., Inc., 1620 Columbia Ave., Connersville, Ind. (Item 43)

Flasher Kits

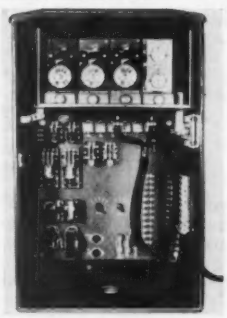
Two disability flasher kits convert self-canceling turn signals into emergency warning signals on trucks, passenger cars, taxis, trailers, etc.

The Kay-Lab heavy-duty disability flasher kit, for trucks and big equipment, includes heavy-duty Universal flashers capable of flashing sixteen 32-candlepower bulbs simultaneously 75 times per minute. They are made in 6 and 12-volt models.

The regular disability flasher kit, designed primarily for passenger cars and taxis, flashes six 21-candlepower bulbs simultaneously 90-100 times per minute. They are made in 6, 12, and 24-volt models.

Both kits come complete with flasher, color coded wiring harness, control switch, fuse and installation diagram, ready for easy mounting on dash and firewall. Neither kit interferes with normal use of directional signals.

Macchi & Co., 819 Valencia St., San Francisco 10, Calif. (Item 44)



Traffic Controller

Model M-35, SVAP is a two-phase, semi-vehicle actuated controller, completely electro-mechanical in operation. The controller is designed for operation in a coordinated system but may also be used to good advantage at isolated intersections. The three dials permit different cycle lengths as well as varying cycle splits, thereby providing control flexibility greater than that available in other semi-vehicle actuated controllers.

The M-35 SVAP is designed for synchronous operation in both interconnected and non-interconnected systems. When interconnected it will maintain any of three offsets selected by the master controller; in a non-interconnected system, the M-35 SVAP will maintain a single offset as is usual with synchronous motors, all without the necessity and expense of synchrolizers. A switch permits non-synchronous (isolated) operation. In "isolated," the lights change to cross street green (after main street clearance) immediately upon receipt of an actuation—providing the main street guaranteed period has expired.

The Marbelite Co., Inc., 175 N. 10th Street, Brooklyn, N. Y. (Item 45)

SAFETY PRODUCT LITERATURE

Marker Light

Install on your vehicle without disassembly. Aluminum, Die-Cast housing with two holes which allow mounting bolts to pass through and engage only rear mounting plate, so light can be mounted from the outside without removing housing. Optional 4-hole mounting available which allows universal replacement without drilling new holes. Arrow Safety Device Co., Holeman Street, Mount Holly, N. J.

For more details circle No. 81 on enclosed return postal card.

Safety Materials Handling

For the fleet owner, Catalog No. 60, has four major sections of safety material handling equipment and accessories. Equipment discussed includes: safety hooks, safety insulated links, mechanical backup alarms, safety truck steps and safety belts. E. D. Bullard Co., 2680 Bridgeway, Sausalito, Cal.

For more details circle No. 82 on enclosed return postal card.

Mercury Vapor Conversion

Designed to convert street lighting heads from incandescent service to mercury vapor lighting, facilitates change-over at low cost and in approximately nine minutes. Complete information available. Transformer Dept., Sylvania Electric Products Inc., Ipswich, Mass.

For more details circle No. 83 on enclosed return postal card.

Vehicle Detection

Bulletin D-165, from Automatic Signal Div., Eastern Industries, Inc., Norwalk, Conn., has as its subject their Electromatic Model RD-2. This radar vehicle detector is said to meet all traffic-actuated signal requirements and solve more traffic signal problems.

For more details circle No. 84 on enclosed return postal card.

Pavement Markers

Applications and general specifications for four-way reflective traffic markers are described in this folder from Trafficaide Corp., Auburn, N. Y. Specially compounded vinyl, tapered and precoated for lifetime bonding to pavement.

For more details circle No. 85 on enclosed return postal card.

Preferred Lighting

Bulletin GEA-7100, 28 pages, provides layouts, specifications and application data for entire street-lighting systems. Includes footcandle guides for General Electric Co.'s line of filament, mercury, and fluorescent units and product data on lighting units, controls, ballasts, poles and brackets. Photos show typical street, highway, shopping center and parking area lighting applications. Foreword describes how to select roadway lighting equipment. General Electric Co., Schenectady 5, N. Y.

For more details circle No. 86 on enclosed return postal card.

Highway Railing Lighting

Information is available from the Michael Flynn Mfg. Co., 700 East Godfrey Ave., Philadelphia 24, Pa. on their Lupton Raillight which is said to offer three advantages when compared with conventional highway road railing and lamp post construction. They are: (1) Greater driver safety from uniform low-level light focused directly on the road; (2) unlimited possibilities for individualized road railing design; and (3) savings in initial cost, operation and maintenance.

For more details circle No. 87 on enclosed return postal card.

Flasher Light

Specifications, dimensions and suggestions for protective use of Porta-Stand flasher safety light standards are described in this bulletin from R. D. Fageol Co., Kent, Ohio. Porta-Stands can be used with all Fageol Flasher Light models. The latter include 2 and 4-inch lens units, uni-directional and 2-way, either Dependa-Pak or transistorized types.

For more details circle No. 88 on enclosed return postal card.

Emergency Lamps and Flares

Literature describing many types of Big Beam emergency lights, barricade lights, hand lamps and flares for emergency use by police and fire departments is available from U-C Lite Mfg. Co., 1063 W. Hubard St., Chicago 22, Illinois.

For more details circle No. 89 on enclosed return postal card.

Reflective Traffic Signs

Stop signs, sign posts and mounting accessories, steel and aluminum warning signs, speed and movement signs, school signs and reflector signals are covered in Catalog 65A from the Cataphote Corp., Toledo 10, Ohio.

For more details circle No. 90 on enclosed return postal card.

Fluorescent Enamel

Described in this folder from the DuPont Co., AP-63, Wilmington 98, Del., is their Pyralux fluorescent enamel for safety and decorative painting of vehicles, aircraft and signs. The actual colors are reproduced along with designs for identification of trucks and buses, description of how the enamel serves its purpose, and directions for use.

For more details circle No. 91 on enclosed return postal card.

Protect Blacktop Surfaces

Bulletin L-1828A, Maintenance Inc., Wooster, Ohio, describes Vynatex 23, a colored coating that is said to protect asphalt pavements against oil drippings, weather, freeze-thaw damage and water penetration and is suitable for indoor and outdoor use.

For more details circle No. 92 on enclosed return postal card.

"Highway Life Lines"

Here is a motion picture which tells how the right traffic paint can be safely and easily selected and specified. Released by Cellulose Products Dept., Hercules Powder Co., Wilmington 99, Del., manufacturers of Parlon, a chlorinated rubber base that is said to bring faster dry and longer life to traffic paints.

For more details circle No. 93 on enclosed return postal card.

Fire Extinguisher Bracket

Walter Kidde & Co. has information on clamping, band-type brackets which can be used with any of the company's 2½ gal. wet chemical portable. Wall, floor or running-board mounted, these brackets can be used with pump tank, cartridge-operated water, pressurized water, pressurized loaded stream (antifreeze), foam and soda acid types extinguishers. Walter Kidde & Co., 145 Main St., Belleville 9, N. J.

For more details circle No. 94 on enclosed return postal card.

Traffic Sign Manual

Packed with illustrations and information on a complete line of street, traffic, school and guide signs and accessories. This manual, available from Lyle Signs, Inc., 2722 University Ave., S. E., Minneapolis 14, Minn., can help you select the most functional signs to meet your needs.

For more details circle No. 95 on enclosed return postal card.

Asphalt-Adhesion Agents

Available are two valuable booklets. Special Report No. 1 is a thorough discussion of cationic asphalt emulsions; the other contains information including important test data on Redicote, asphalt adhesion agents. Armour Industrial Chemical Co., Div. of Armour and Co., 110 N. Wacker Drive, Chicago 6, Illinois.

For more details circle No. 96 on enclosed return postal card.

Aerial Bucket

This hydraulic aerial bucket, the Pitman Pelican, enables overhead maintenance crews to go aloft safely and quickly. Upper boom and bucket are manufactured of non-conductive fiberglass. Dual control are provided in the bucket and truck. The bucket supports 300 pounds and is self-leveling. The Pelican uses no outriggers and comes in three heights. Pitman Mfg. Co., Grandview, Mo.

For more details circle No. 97 on enclosed return postal card.

Bituminous Distributors

Featured is a principle of tank circulation that is said to provide uniform heating, prevents overheating, burning and "hot spots." Recirculation prevents nozzle clogging, and the spray bar is uniformly fed. Front-end controls are used to give the operator unobstructed visibility and keep him out of fumes' way. Seaman-Gunnison Div. of Seaman Corp., P.O. Box 3025, Milwaukee 18, Wis.

For more details circle No. 98 on enclosed return postal card.

Train Five Million

From Page 12

is getting into driving trouble would benefit.

The selection of courses or lessons to fit different license violator backgrounds is equally important. The man who knows safe driving practices needs something designed solely for impact on attitude. A course in driving skills would be largely wasted. For him motion pictures and lectures by police, judges and license examiners might be suitable. Class room only or behind-the-wheel only, fit still others. But for many, a reasonably thorough course would have best long range results.

Public relations wise, motor vehicle departments stand to gain considerably by having safe driving courses available in their "driver improvement kit." No one can claim that they have not made every possible effort to go beyond mere restrictive action and salvage license violators and put them back on the road. Where the safety course treatment fails and the driver is again convicted of a violation, the state is in an unassailable position when it immediately takes the driver off the road.

Adult Driver Education in Off-Job Programs: Increased activity by industry in off-the-job safety programs offers a good opportunity to reach adults with driver education. In many plants, lost man hours due to traffic accidents are greater than hours lost to on-job accidents.

Effective books and leaflets distributed to employes, if handled properly by management, constitute good public and employe relations and help prevent accidents.

There are numerous combination training programs, provided especially for employes, which could be expanded to include other members of the family. This should be done where possible.

Driver Education Through Media and Films: Media and films will play important roles in a nationwide adult driver education drive. Driving situations in which individuals find themselves can be adequately shown in little space and short time. A substantial amount of public education can be achieved by use of newspaper mats, films and slide films, trailers for theaters, and TV slides and movies.

Summary of Approaches

1. If all high schools offered driver training courses to adults, instead of the 12 per cent who now do so, we could produce approximately 660,000 trained adult drivers per year.

2. Given five years careful state licensing, supervision and upgrading, the private professional driving schools could turn out two million reasonably trained adults a year.

3. Local community and county violator schools which now number about 150 might be expected to increase to 200 in number. With an average of 500 violators to a school this would result in the training of 100,000 adults per year.

4. Adult driver training by license violator schools, if given to half of the more than 600,000 personal interview and hearing cases handled by motor vehicle departments would reach 300,000 a year.

Training in the above four areas would total three million adult drivers a year, and a nationwide educational program designed to induce drivers to seek training voluntarily might add another million to this figure. By stimulating growth in high school training and violator and driver improvement school output the figure could be boosted another million.

Thus, with substantial underwriting of at least $500,000 and a five year plan of action, it would not be impossible to gear up to train five million adult drivers a year.

Adult Training Materials

Not nearly as much progress has been made in producing good training books and materials for adults as for our high school courses. This has held back the adult training movement.

How should we prepare better adult materials? The first step, and perhaps the most difficult one, is to break clear away from other materials and start de-novo. For example, it would be a mistake to take an excellent high school text book used in driver education classes and try to adapt it to

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Circle Item No. 6—Reader Service Card

adult use by merely shifting the language but retaining sequence, content, etc. What would be produced could be sound and technically correct, but would not fit the specialized objective.

While all books should be interesting, this factor is much more important with adults who have left the learning environment of the school. For this reason adult driver training material should be written first to be interesting and second to convey information. If it is not interesting it will not be read by many and the safety content is thus of little value. Numerous elements go to build up the interest factor.

The adult preference for illustrations, as demonstrated by *Life* magazine and tabloid newspapers, must be taken into account. Text must be kept at the absolute minimum. Color drawings must be used. Line drawings and diagrams can be boring, so illustrations should be in perspective. For emphasis and change of pace, abstract drawings should be used wherever they can establish the point. To avoid monotony, numerous different layouts are essential.

To carry out the concept of quick visualization the text should be restricted—never more than 100 words to describe a point.

Attention arresting headings are needed and language of the text should avoid the overworked words commonly used in the field. The text should be written in the vernacular, with humor used to drive points home.

The format and number of cases should be deliberately set to produce a reasonably sized book, under 200 pages. The text book appearance should be avoided, since to most adults this has some "discouragement" value.

Only the highest priority items should be included. Intentionally omitted should be such items as accident facts, auto mechanics, manipulation, parking, backing, scientific items such as centrifugal force, gravity, friction, stopping distance and reaction-time tables. These are valuable, but can be used only when more time and space are available. They can be readily obtained elsewhere.

All admonitions, warnings, horror references and general safety flag waving should be omitted.

The philosophy adopted should not be one of "safe driving" but of "expert driving," which it is believed is better received. The automobile was not designed to create safety, but to produce transportation. If used skillfully it can get you there quickly—and also safely.

Within the time periods most adults can afford, will spend, or can endure without sagging, such a book would cover a lot of solid ground. After it is obtained, the next step would be to pick its materials up in slide film, television slides, films and other visual aid forms. It should be supplemented with whatever materials instructors feel desirable, always keeping in mind the interest factor and the optimum-minimum time effective with most adults.

Based on these principles, the overall approach, or angle of attack, should be studied. The "situation approach" is recommended.

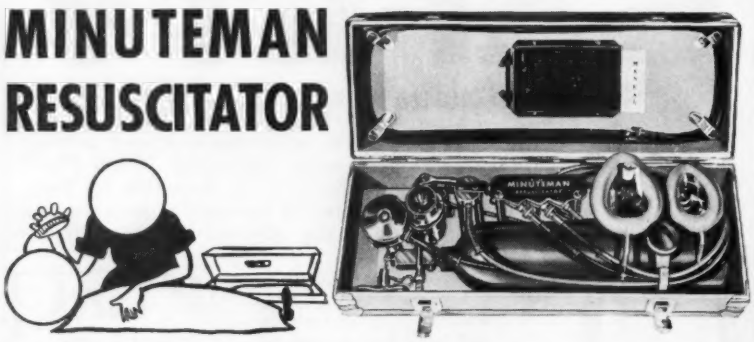
The Situation Approach

There has finally been assembled in full blown form for the first time, a basic approach to skillful driving which does not come at accident causes through law, mechanics, manipulation, figures or attitude per se. It is called the situation approach. This looks at the problem of safe driving in terms of what the driver sees ahead, beside and behind him; what it means to him; what he should do about it, or should have done before he arrived at the situation. This is the essence of how to get along in the traffic stream. Its appeal is that it deals with the practical things which motorists see and can therefore be interested in learning more about.

The beginning of the approach is one of identification. It is so easy to look at things with the eye and not see them with the brain. Many of our drivers sail into driving situations which are potentially dynamite without knowing where they've been, and without that heart slugging chill brought on by knowledge of what

Somebody lives, because somebody else had a

MINUTEMAN RESUSCITATOR



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might have happened. They escape either by pure luck or because other drivers compensate for them.

In one publication as many as 200 situations are identified and covered. Perhaps there are another 200 blood relatives. Surely if a person can master the 200, or even the 100 most important, his chances of survival are vastly increased, and substantially more than if his learning concentrated on law, mechanics, manipulation and figures. If this reasoning is valid, then time in any educational program should be made available to cover them adequately, even if this means cutting back on other emphasis in approaches.

Identifying Traffic Situations: Learning to be alerted to dangerous traffic situations is no different intellectually than learning to know and protect oneself from other dangers of our environment—the storm, fire or flood; walking around a ladder because it looks precarious; the pilot swinging around a thunderhead; the ship's captain slowing down approaching a fog bank.

Interpreting situations: After identification the next step is learning to interpret the various hazardous potentials and determine what steps to take to keep from being victimized. What cars or pedestrians are in the way, or are in a position to get in the way of the normal path or alternate path? Does this require an increase in alertness, preparation to slow down, actually slowing down, stopping, or pulling clear off the road? Making such decisions accurately and quickly often is the major difference between an accident or a near miss.

Avoiding situations: The situation approach also adds a kind of new dimension. It goes beyond "defensive driving" and adds an offensive element, to head off trouble. (This could hardly be called "offensive driving.") This deals with learning to place the vehicle in a less vulnerable position in the traffic stream. It points out places in the traffic chess board where the odds are very poor. It shows instances where picking up speed is advantageous. Obviously, staying out of trouble is better than getting into trouble and learning how to get out of it.

Situations and the law: In teaching by use of situations, the correct and legal maneuvers can be set forth. If a learning driver applies these maneuvers he is automatically a law abiding driver. The situation method is analogous to the case method of teaching in law school where the case is presented and the law applied to it.

The advantage of the case or situation approach to teaching expert driving can be illustrated by our speed laws. They have provisions making it illegal to drive too fast for conditions, but not spelling out those conditions. But with a series of illustrations these conditions can be perfectly illustrated.

Given enough time, and there is almost never enough time, an instructor could apply all the law that fits each of the 200 or more situations.

Situations and Traffic Control Devices: Knowing that the law requires a stop on a red light or at a stop sign covers only a small fraction of what the driver needs to know. The stop sign is an example. The first stop at the point required by law is only the beginning. What follows afterward can be even more important. A second stop to see around parked cars or shrubbery is possibly more essential. Waiting for a simultaneous gap in cross traffic from both directions, so the car can clear the whole intersection, is equally important.

Situations and Attitude: After studying 200 driving situations and learning how many possible ways there are to be hit, and how little is to be gained by imposing on the driving rights of others, a driver's outlook and attitude should be influenced for the better. Some cases will point out how foolish a driver will look caught in some maneuver and the student is almost certain to try to avoid it in the future, although his natural instincts might be to attempt it. Other situations will show cases of "selfish courtesy" where being polite saves time. Becoming an outstanding driver by acquiring expert knowledge develops a sense of achievement and pride.

Situations and Psychology: The situation approach as a teaching device can be made extremely interesting and exciting. Things are shown getting ready to happen. Things move and fascinating things take place. The outlook is positive, including how to outwit the bad or stupid driver. There is the intriguing element of finding solutions to complex situations, a kind of game aspect. This kind of instruction is refreshing compared to saying "now let us consider the car, the road and the driver."

For the adult, some of the older approaches still have some place in instruction. Some law must be taught to avoid arrest, and limited mechanical instruction is needed to encourage good maintenance. Minimum manipulation is essential, although very few accidents result from errors or lack of smoothness. Statistics and mathematics are so boring to most adults that they should be used with high impact and minimum detail.

It is sincerely believed that if a national *adult* driver education project is set up, backed by $500,000 for the first three years, a five year plan could be evolved which could result in a training rate of five million adult drivers a year. This would have tremendous influence in reducing the tragic number of accidents within the total driving population.

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Tape Measure

From Page 20

in a car. He decided to inspect the vehicle and radioed ahead for a road block. The driver stopped the car just short of the block. McCarthy pulled up behind and stepped out of his car, riot gun in hand. The driver started up again and McCarthy fired at the rear of the car, aiming low because he had not yet made positive identification.

The robbers decided to crash the road block and, as they went through, another trooper fired at them. McCarthy jumped back into his car and followed the fleeing car. He was joined by Trooper Ed Burke in another patrol car, which was faster and passed Tim at about 100 m.p.h. on the heavily travelled highway. Burke then skillfully shot through his own windshield and hit the robber's car, steering one-handed while firing. The holdup car went out of control and off the road. One of the men ran from the car and Burke chased him and shot him in the shoulder as he was going over a fence.

McCarthy followed, thinking the other two men had gone over the fence, too. Burke yelled to McCarthy that the other two were still in the car and as Tim swung about, he saw the two men crawling from their car.

The Capture

McCarthy threw the pair to the ground, covering them while Burke, his ammunition gone, captured the third man. This all took place in about 15 minutes. The troopers captured their men and also recovered $20,000 in cash and checks that had been stolen from the supermarket.

In the light of such adventures, the regular routine of state police work seems rather pale, but McCarthy feels that the Signal Ten interviews—though not spectacular—help to educate motorists. He feels he's helping to reduce the slaughter on our nation's roads.

Two things that a regular listener to Signal Ten will notice are: Tim's consistently polite, yet firm approach in his contact with traffic violators, and an attitude of insult, and abuse that often characterizes the replies of the person who has been stopped.

Special Cases

Many drivers, forgetting they are being interviewed as violators, sound off as if it were their duty to tell McCarthy how incompetent fellow motorists are and what should be done about such "maniacs." Other drivers feel it is a chance to give their views on how police work ought to be done. McCarthy has found that most violators have something in common. Ironically, it is that each feels he is *different*—a special case to be handled with leniency.

McCarthy feels that broadcasting the actions of people he stops will make listeners not only realize how silly it is to try and avoid the issue, but of how equally foolish it is to violate the law in the first place.

Only about one out of four interviews reaches the air because people often don't talk up, their interviews are simply not interesting enough for radio, or background noises are too great. The noise of trucks and other traffic is the main problem in making the recordings. For this reason McCarthy steers violators into the squad car for interviews.

Tapes are broadcast on WGN about a month after interviews are made. They are then sent to Indiana State Police headquarters at Indianapolis where the Visual Aids Section produces and distributes duplicates for rebroadcast, on a rotating basis, to 20 Indiana radio stations. They are also used in the Driver Improvement School at Hammond, Indiana, and as regular features on the Armed Forces Overseas Radio Network and on Radio Free Europe.

The future looks bright for Signal Ten's effectiveness: three additional tape recorders are being added to the project, to be used by officers specially trained for the assignment with materials assembled by McCarthy.

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Traffic Safety

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. . . give me commentators plain,

RESEARCH BRIEFS

BOOK REVIEWS

A pleasure that all too rarely comes to an editor is the opportunity to review the work of others that is of an outstanding nature. During the past month, we were twice blessed. It can be said without qualification that both books mentioned below should be in the library of every individual concerned with traffic safety.

Dictionary of Highway Traffic by J. Stannard Baker and William R. Stebbins, Jr., published by the Traffic Institute, Northwestern University; 300 pages, illustrated, cloth bound, $6.00.

The need for better understanding and greater precision in the use of terms relating to highway traffic and traffic problems has been obvious for at least a decade. Specialized vocabularies have emerged for many groups—highway engineers, traffic engineers, vehicle manufacturers, regulatory agencies, legislators, and others—all of them concerned in various ways with highway traffic and safety. By developing separately and independently, these different vocabularies have produced widespread confusion and misunderstanding. They have, to an inestimable degree, handicapped the national effort to improve highway safety and reduce motor vehicle congestion.

Now, for the first time, the numerous technical vocabularies in the general highway traffic field have been brought together in a systematic fashion in a single volume. *"Dictionary of Highway Traffic"* is a consolidation of several technical languages, but most important: it systematically shows the differences and similarities among terms currently used by several or all of the groups involved.

The main purpose of this book is to improve communication among technical and specialized groups in the highway traffic field. The scope of the dictionary is limited essentially to the technical language most useful to all of them. For example, distinctions are drawn between such terms as "junction" and "intersection," "registration" and "licensing," and "supervision," "control" and "direction."

Terms and definitions were compiled from over a score of authoritative texts and glossaries. Many of these sources had included the same terms but had given them different definitions. In these cases the several definitions are presented in the dictionary along with discussion of their comparison and usefulness. About 10,000 terms are considered including the basic vocabulary, synonyms, antonyms, contrasting expressions, analogous forms, etc.

The book is extensively illustrated with over 80 line drawings and charts showing genera-species and classificatory relationships between technical terms used in highway traffic.

Dictionary of Highway Traffic will be an indispensable reference and guide for highway planners, traffic engineers, vehicle manufacturers, lawyers, educators, police officials, judges, prosecutors, driver-license and motor vehicle administrators, journalists, armed forces personnel, students, legislators, mayors and city managers, and others.

The Psychology of Driving by A. R. Lauer, to be published by Charles C. Thomas, 301-27 E. Lawrence Ave., Springfield, Illinois, in August, 1960. Price not yet determined.

In his latest text, Dr. Lauer demonstrates why he has for many years been considered one of the foremost authorities in the fields of driver education and traffic safety. Skillfully blending the theories and research findings from a multitude of disciplines, he furnishes the reader with as thorough and comprehensive picture of the driver and the traffic environment yet seen. This book, while of shorter length compared to usual textbook standards, is almost encyclopedic in its coverage. The book is deserving of a far more comprehensive review than space here permits. The reader can be assured, however, that not only is this text extremely informative, but better written than many novels currently on the popular market.

Two Reviews of Accident Research

A booklet, *Two Reviews of Accident Research* has been published by the Association for the Aid of Crippled Children. Two monographs are presented: "Current Research in Childhood Accidents" by E. A. Suchman and A. L. Scherzer; and "Youth and the Automobile" by R. A. McFarland and R. C. Moore. The first article comprehensively treats such important topics as: conceptual approaches to the accident phenomenon, extent and significance of the accident problem, evaluation of current data and theory, methodological approaches and specific areas of needed research.

. . . who with no deep researches vex the brain

—G. Crabbe (1754—1832)

The second article treats the role of the automobile in American culture with particular reference to adolescents and young adults. The influence of the automobile on the behavioral and cultural patterns is reviewed.

Limited copies of this publication are available by writing:

Association for the Aid of Crippled Children
345 East 46th Street
New York 17, N. Y.

John J. Flaherty

THE AUTHORS

T. M. Chubb

Graduating from the University of California in 1925 with an engineering degree, Mr. Chubb has since been responsible in some capacity for financing, operating, safety, rate and virtually all other matters for all types of utilities.

For approximately 12 years, he was a special representative for Pacific Gas and Electric Company; for approximately six years, senior engineer with the California Public Utilities Commission. During World War II, Mr. Chubb was Western Area chief, Office of War Utilities, War Production Board, Washington, D. C. Following that, he became an officer of the Pacific Lighting Corporation. He was assistant general manager and since 1951 has been chief engineer and general manager of the Department of Public Utilities and Transportation, City of Los Angeles.

Mr. Chubb is a registered professional engineer, public accountant and member of various professional, civic and fraternal organizations.

Richard P. Crinigan, Jr.

Engaged in the private practice of optometry in Albany since 1950, Dr. Crinigan is chairman, Committee on Motorists' Vision and Highway Safety of the New York State Optometric Association and served on the same committee of the American Optometric Association for two years. He is past president of the Eastern New York Optometric Society, was delegate from the New York State Optometric Association to the Eastern Regional Conference of the President's Committee for Traffic Safety, Atlantic City, 1956 and 1958.

Dr. Crinigan attended Dartmouth College, and Siena College and graduated from Columbia University School of Optometry. Post graduate studies were taken at the Massachusetts College of Optometry.

H. Laurence Ross

Dr. Ross is a member of the Department of Sociology at Northwestern University and is the behavioral scientist for Case Studies of Traffic Accidents at that university's Traffic Institute. His assignment on this project has been to explore the applicability of sociological theory and research methods to the study of traffic accidents.

Graduated from Swarthmore College in 1955, he received his doctorate from Harvard University in 1959. During his graduate years, Dr. Ross served as research assistant to Samuel A. Stouffer and spent a year at the University of Chicago as a Fellow of the Social Science Research Council. His areas of special professional interest, as represented by his previous publications, are community structure and the social psychology of city life.

Robert P. Shumate

Shumate was a trooper in the Maine State Police for 6 years, 1949-1955. During this time, in 1953-1954, he attended the Traffic Institute at Northwestern University, where he was a participant in the 9-month training program in traffic police administration. In 1955, he joined the field staff of the Traffic Institute, and, in this capacity, developed and directed a training program for the newly organized Wisconsin State Highway Patrol. He was appointed to the position of Assistant Director of Research and Development at the Traffic Institute in 1957, and was made Associate Director of Research and Development in 1958. He is presently Assistant Director for Research and Development of the Field Service Division, International Association of Chiefs of Police, Washington, D. C. In this position, he is engaged in directing an expanding program of research in motor vehicle traffic supervision, and the development of research projects in other major areas of police activity.

Milan Vamosi

Dr. Vamosi is one of the leading European authorities on alcohol and its medico-legal problems. He received the M.D. degree in 1949 and in 1958, he received the degree C.Sc. Med. from the medical faculty at Bratislava, Czechoslovakia. Since 1949, he has been on the staff of the Institute of Forsenic Medicine, Komensky University at Bratislava. He was recipient of the Reinsberg prize in 1955 for his work on the determination and estimation of drunkenness, and in 1957 received the prize of the Slovak Medical Association for his work on accident risks. He has published in excess of 40 papers during the last 10 years and, with three collaborators, has authored a textbook on toxicology. At the Forsenic Medical Laboratory, he and his staff have conducted approximately 4,000 blood examinations for alcohol each year. He has given many lectures throughout Europe on the subject and is presently engaged in the problem of standardization and unification of methods for use in this area.

Schematic Analysis of the Driving Situation

by H. Laurence Ross

Driving as a process can be conceptualized as the interaction of three components: a vehicle, a roadway, and an operator. Two models are presented in this paper. In the first, non-social, model, the operator is seen to guide the vehicle over a roadway without any other vehicles operating simultaneously. The second, more realistic, social model adds the presence on the roadway of other vehicles, operated independently of each other. The first model is contained within the second, but is considered separately in order to demonstrate the increased complexity of the driving task introduced by the requirements of social order.

Possibilities for the occurrence of accidents appear in even the simplest of driving tasks. Additional possibilities occur with the introduction of complications. These possibilities will be specified in the course of the paper, and research opportunities will be stressed.

1. The components of driving

The task of driving is to get cargo to a spatio-temporal goal. The cargo may be people, goods, or both. The goal is arrival at a geographical location within some limited period of time, although the location may be stated broadly (e.g. "the country") and the time limits may be very flexible (e.g. "this afternoon").

The driving task requires the following items:

(a) A vehicle, the properties of which are to contain the cargo and to move. A vehicle must be controllable to maintain constant velocity and direction, as well as to make a variety of changes in velocity and direction upon receiving appropriate instructions. The controllability of a vehicle is relative to the roadway on which it must move, and to the abilities of the operator. An Army jeep, for instance, must have different properties from a Chevrolet, in order to meet the criterion of controllability. Research should be relied upon to clarify the assumptions made by the designers of the vehicle with regard to the characteristics of the roadway and operator.

(b) A roadway, which is a two-dimensional path for a vehicle. The roadway must be free of obstacles in order to function adequately as a path. An obstacle-free road is capable of supporting the vehicle, and is predictable to the operator. Support is relative to such qualities of the vehicle as its size, shape, weight, and range of velocities.

This paper is an interim report of the Experimental Case Studies of Traffic Accidents, supported by the U. S. Bureau of Public Roads (CPR 11-5981); National Institutes of Health, U. S. Public Health Service (RG-5359); and the Automotive Safety Foundation.

Predictability is dependent on either perceptual clarity or the possession of symbolic messages to substitute for perceptual clarity, and both are relative to capabilities of the operator, such as visual acuity and symbolic comprehension. Research should be relied upon to clarify the assumptions made by the designers of the roadway with regard to the characteristics of the vehicle and the operator.

(c) An operator, who must be capable of controlling the relationship of the vehicle to the roadway. The capability of the operator is relative to assumed properties of the other elements in the driving situation. More capability is required for the operator of a large bus operating in city traffic than for the operator of an automatic-shift, power-controlled sedan on a toll road. The operator must be able to perceive the relationship between the vehicle and the roadway, judge the extent to which it is satisfactory, and, if he judges it unsatisfactory, plan and effect a new relationship.

2. The open-road model

The vehicle-operator-roadway combination, in the absence of other such combinations, can be viewed as an interlinked system, in which each component assumes certain properties on the part of the others. Probably the closest thing to a "given" in the system is the operator, a statistical abstraction made by the designers of the other components of the system. Without introducing the complexities of competing drivers, it becomes evident that one possibility for failure in the system arises because of the variability of human populations on exactly those traits assumed by the designers of vehicles and roadways. Certain individuals will not possess the qualities assumed, and, unless these individuals are screened by an infallible screening process, accidents will occur in a world of manipulable vehicles operating on obstacle-free roads. Research should determine the cutting-points for the distributions of various traits in typical human populations at which the assumptions of roadway and vehicle designers are no longer met. Individuals falling below such points can be designated *a priori* as "unsafe drivers."

This simple model indicates other possibilities for failure when one adds the realistic assumption of significant changes over time in the characteristics of vehicles and roadways. Old roads were built assuming old vehicles, and the presence of vehicles exceeding the ranges of traits assumed by the roadway designers of a past era introduces obstacles into formerly obstacle-free roadways. Likewise, older vehicles may not meet the assumptions of the builders of new roads. Research should determine the adequacy of actual road designs to the vehicles being operated over them.

The simple model can be shown to include assumptions about conditions external to the system, the failure of which will also be associated with accidents. Such items as clarity of the air, presence or absence of moisture or ice on the road, stability of the earth's surface, and the like, may vary in random or other fashion and generate accidents by their action on the roadway-operator-vehicle system.

3. The social model

Driving is not generally so simple a task as is described above. A fourth factor found in most real driving situations is the presence of many (vehicle-operator combinations) using a given roadway for independent goals. It is this factor that makes driving a social task, and that greatly complicates the problem of getting cargo to a goal. Goals that are independent are often competing. The utilization of a single roadway by thousands of vehicles per hour, as occurs on many modern arteries, would be impossible were there not an impressive set of social mechanisms for the imposition of order into driving.

As vehicles travel over a roadway network in different directions and at different velocities, an operator must be able to predict the behavior of all other drivers during the period in which there is a relatively high probability of their becoming obstacles in the path. Thus, a need is created for each operator to have a generally valid set of assumptions about what the behavior of other drivers is likely to be. A set of rules, accepted by all operators, serves this function. These rules of the road are backed by the authority of formal law. They simplify the driving task considerably, although not to the point indicated by the simple model discussed above. As more components are added to the driving system, the possibilities for failure of the system as a whole are increased. Such a failure we term an accident.

Primary among the rules of the road is a set governing the relationship of drivers to the road dimensions. Such rules are lane laws, passing laws, following laws, turning laws, and the like. These rules simplify the operator's task by allowing him to treat a multiplicity of vehicles as a "stream of traffic," the course of which can be assumed. Stream-of-traffic rules are not invariant, as the existence of independent goals for components of the stream must be recognized. The permission for variance allowed to the components of a stream of traffic is modified by imposing responsibility for communication of variant behavior. This responsibility is embodied in a set of rules of the road requiring signaling where the variant behavior may require modification in the behavior of other drivers.

Roadways intersect, and conflict between two or more streams of traffic is frequently the result. A set of rules of the road determines precedence in such instances. Right-of-way rules, and rules referring to traffic control devices are examples.

A supplementary set of rules of the road is concerned with adjusting the capabilities of the vehicle to the tolerance of the road, or, in other words, assuring that the assumptions made by the designers of each with respect to the others are met. Such rules are exemplified by speed limits, one-way rules, etc.

Finally, responsibility of the operator with respect to the rules of the road is insured by such laws as licensing and the prohibition to drive while under the influence of alcohol. The knowledge that operators are operating under

the rules of the road is essential to order. For this reason, these rules are the foundations of the entire system of rules of the road.

While the rules of the road, when obeyed, should insure order in the driving situation, the rules themselves recognize the possibility of deviance, and instruct operators to make allowances for deviant acts on the part of others, as well as unexpected inadequacies in vehicles and roadway. This is reflected in the general overstrictness of traffic regulation, termed the "margin of safety." One dysfunction of the margin of safety is that a driver who assumes better than average or better than minimal conditions is tempted to deviate from the rules.

The social model introduces changes into the vehicle and roadway components of driving as well as into the operator. Because of the containment of the operator within the vehicle, and because of the speed at which driving is expected to be performed, the natural human communications apparatus becomes inadequate to perform the communicative duties enjoined by the rules of the road. A special communications system must be built into the vehicle. This must be controllable by the operator, and equipped to send all messages prescribed by the rules of the road. Social communication in driving is not directly operator-to-operator, but rather driver-to-driver, between operator-vehicle systems. Its content is limited by the mechanical equipment constituting the vehicle sector of the system, as well as by possible roadway and other features which serve as limitations to the spatial transmission of messages.

The roadway in the social model must possess, in addition to the qualities required by the simple model, facilities for the unimpeded passage of more than one vehicle. In general practice, this usually means at least two sectors, divided to accommodate streams of traffic moving in opposed directions. Furthermore, differential velocity of vehicles moving in the same direction creates the necessity for the roadway to provide facilities (passing zones) to minimize the friction generated in a given lane by vehicles of varying capacity. An extension of this latter point is that provision must usually be made for the accommodation of temporarily or permanently stopped vehicles.

4. The genesis of accidents

Accidents are the result of failure in the complex real system of many drivers operating on a roadway net. Our approach will be from the point of view of the operator, as this is the source of our information concerning a given accident. We shall attempt to indicate the ways in which the inadequacies of the operator may be related to inadequacies in the other system components, resulting in accidents.

The task of the operator, as noted above, is to control the relationship of the vehicle to the roadway. This may be divided into two parts: the obtaining of accurate information concerning this relationship, and the effecting of appropriate action based on this information.

In the acquiring of information, the first step is perception. A vehicle-roadway relationship in the social model is inadequate if the vehicle is likely to leave the roadway or to collide with an obstacle, be it an inanimate feature of the roadway or another driver. The perception of this likelihood is necessary to prevent an accident. There are many places in the system where this perception may suffer interference; that is, where perception of an unsatisfactory relationship may be absent, partial, or distorted.

Inadequate perception can be a result of conditions within the operator, considered as a system in himself. Inaccuracies, distortions, and the like, within the sensory, particularly visual, apparatus of the operator will have this result. Research into the distribution of accident factors ought to include testing of the perceptual acuity of the operators in question.

There are other aspects of the total system that enter into the perception process, although not as obviously as sensory impairment. These items are functionally equivalent, however, to such impairment, and ought to be considered and researched with equal intensity in order to state the degree to which inadequate perception might have been involved in a given accident. One class of such items is obstacles to vision. These obstacles may be properties of the vehicle, of the road, or of outside systems impinging on driving. Examples of this class are vehicle stickers, rear-view mirrors, and "blind spots" caused by the placement of solid members of the vehicle body, trees and buildings by the roadway, snow, fog and other weather conditions. Whether located within the person, or as properties of the vehicle or roadway, these conditions all function as "motes and beams"* with respect to the perceptual process. They should be investigated in studying the causes of accidents.

Another obstacle to adequate perception is distraction, a large and heterogeneous class of events which interfere with normal or usual concentration habits and adversely affect perception of the vehicle-road relationship. Unusual sights and sounds, tense and annoying situations, actions of people within the car, and a host of other events can serve as distractions. Research should be directed to ascertaining the various common driving distractions, and a thorough search for distractions should be included in the study of an accident.

Furthermore, various "faulty" driving habits can reduce effective perception. The human visual field is relatively limited, yet it is imperative for the operator to survey all directions while driving. The best compromise, forming a kind of ideal habit pattern, might be to concentrate on various sectors of the total possible field in proportion to the likelihood of hazard eventuating within in each sector. It is possible, however, to adopt other habit patterns, such as not paying much attention to a particular sector, even when action contemplated is such that the probability of hazard within this sector is quite high. For instance, the failure to check a rear-view mirror when pulling into a left lane might be an unfortunate habit pattern, restricting

*Ed. Note: see Matt. 7:5.

the perceptual field in an unwise fashion. The most common faulty habit patterns should be determined by research, and their presence or absence sought in persons involved in accidents.

Even, however, with an ideal habit pattern, the fact of limited visual field, making it impossible to survey all sectors simultaneously, will yield a certain probability of not seeing a hazard in any given sequence of perceptual scanning. If one concentrates on the most dangerous sectors, hazards in the less frequently hazardous sectors become subject to time-lags in perception. There is no habit pattern that can completely eliminate this probability. Thus, what might be called "chance," coupled with the limitations of human perception, can result in failure to perceive a hazard. The role of extremely low probability, or chance events in accidents should be clearly recognized by safety specialists. There is no way, aside from enlarging the field of vision by some mechanical means, to eliminate perception errors of this nature. With good habit patterns, the absence of distractions, no obstacles to vision, and good physical conditions, the limitations of human perceptual apparatus, even at its best, allows room for the occurrence of accidents. Research on particular accidents should try to ascertain the perceptual focus of the driver in the seconds prior to the accidents, in order to estimate whether such perceptual failures might be involved.

Assuming prompt and adequate perception, there is still the problem of interpretation before the operator can be assumed to possess accurate information concerning the relationship of the vehicle and the road. Even in the non-social model, there is the necessity that the operator shall have learned to predict the behavior of physical, or non-willful, objects in a successful fashion. For instance, the lone driver on a curving roadway may misjudge the limited speed required because of unsatisfactory understanding of the physical principles involved. The knowledge required is not a scientific understanding of principles, but a practical predictive power. Research should test operators' predictive powers.

Further expectations are introduced in the social model. In order to interpret a possible social hazard, the driver must be aware of its probable future positions. Illegitimate expectations, the lack of knowledge of the rules of the road, or distorted knowledge of these rules, will lead to inaccurate interpretation of sensory information. On the other hand, the operator may possess legitimate expectations, but these may not be fulfilled. Another driver may deviate from his traffic lane without proper communication, or may emit misleading symbols. This in turn may be the result of illegitimate expectations, mechanical failure, or other factors in the other driver. Drivers' expectations, and their correspondence with the valid rules of the road, should be examined in particular accidents.

Having achieved accurate information, the operator is still faced with the problem of taking appropriate action. The first step, having judged the vehicle-roadway and for for the vehicle-vehicle relationship to be unsatisfactory, is to survey the alternative potentialities for action. This survey may prove to be inadequate for such reasons as the emergency nature of the situation—there is inadequate time to survey all reasonable alternatives—or panic or fixation of the operator. Accident research should determine the extent to which relevant alternatives were surveyed, and the reasons, temporal, emotional, or other, for failure in this operation.

For each alternative surveyed, it is necessary for the operator to estimate the consequences. Problems here resemble those met in interpreting any given perceptual situation, and may be more difficult to solve. The estimate of consequences in the social model must include an expectation of the other driver's reactions, which may involve illegitimate assumptions or legitimate assumptions about the other driver's behavior that are contravened. Likewise, physical assumptions are involved, which may prove to be wrong. For instance the time necessary to complete an action may not be properly evaluated. The complexity of the estimation may be so great, moreover, as to oversimplify the situation and leave out the effect of competing hazards not involving the items included in the emergency as defined by the operator at the moment. The appropriateness of evaluation of consequences for the alternatives surveyed should be determined in accident research. The sources of error should be catalogued.

A choice must be made among the various alternatives. We assume that the choice with the least risk will be made, allowing for miscalculations of risk as explained above. There is a possibility that given operators will assume a risky choice out of a positive valuation of risk itself. The reasons for this, should such people be discovered in research, will have to be explored.

Finally, having made a decision in favor of a given action, the action must be implemented by the operator. Inadequate action may be categorized as partial, faulty, or no action. The problem may lie within the operator, as a lack of skill, or panic and immobility. It may occur within the vehicle, as a lack of mechanical controllability, or within the roadway, especially as the passage of time involves new roadway conditions that in many cases could not have been fully evaluated in considering the possibilities for action. Research must inquire into the causes of faulty action, if such is demonstrated.

5. Summary

This paper has taken the view that driving is a process in a system involving an operator, a vehicle and a roadway. Failures in each component, and in the interaction of the components, will result in accidents. The presence of independent drivers with independent goals on a single roadway net will increase the opportunities for system breakdown, although a set of control measures, known as rules of the road, are introduced to counteract the disorder introduced by these additional components. It is hoped that this type of analysis, if substantiated in research, will lead to a new categorization of accidents, and add some insights into the directions available to accident research.

DETERMINATION OF THE AMOUNT OF ALCOHOL IN THE BLOOD OF MOTORISTS

by Milan Vamosi

Many scientific groups have met during the last decade to investigate the question of alcohol and its effects on driving. In 1950, Stockholm was the venue of the first International Conference on Alcohol and Traffic. The second such Conference took place in Toronto, Canada, in 1953. In 1956, at Istanbul, Turkey, the Twenty-Fifth Congress Against Alcohol convened, and the Vienna Criminological Congress met in 1957. In addition to the above, two summer schools on the same subject were held at Geneva.

When all the statistical facts presented at these Conferences are compared, discrepancies are so obvious and so great that there is much reason to doubt the accuracy of the information. In addition to the critical observations of these discrepancies, it has also been noted by several commentators that even the most recent information contains statistics considered to be suspect. Valid findings depend upon standardized terminology, identical definitions and terms, and the same methods for compilation and evaluation. Unfortunately, these conditions do not yet exist. Investigators are thus hampered in making a definitive evaluation concerning the question of the influence of alcohol on road safety. If a standardized terminology were available and similar methods were used universally, it would be a relatively simple matter to compare statistical data obtained from the various countries and cities.

Various institutes of forensic medicine have issued statistics dealing with cases of road deaths resulting from the influence of alcohol. In Poland, Putchowski determined that alcohol was involved in 42 per cent of traffic fatalities.

Translated by P. E. Burke and Eva Marshall.

At Bratislava, it has been found that alcohol was involved in 41 per cent of all the cases examined over the past five years. The findings of both these groups correspond quite closely to the figures published by Hansen and Jentzsch, who found that 47 per cent of road deaths examined in Berlin involved alcohol.

Prior to 1952, at the Institute of Forensic Medicine at Bratislava, systematic checks of the alcoholic content of the blood of dead bodies were not undertaken. At that time, current methods indicated that some 12 per cent of road deaths came "under the influence of alcohol." In 1952, a system was initiated wherein a systematic check of the alcoholic content of the blood in urine was made for every autopsy. The percentage then rose to 21.4 per cent; in 1953, it had risen to 35 per cent; and in 1954, to 42 per cent.

It is highly inconceivable that the Czechs suddenly increased their liquor consumption by such a large amount; but this systematic investigation did reveal many cases where alcohol could not have been proven or would not have been indicated, by subjective examination. It is believed that these findings shed new light on prior evaluations and previous compiled statistics which were based only on subjective investigations of alcoholic consumptions or, in some few cases, on the diagnosis of alcohol in the contents of the stomach in autopsy cases. It is clear that such previous "investigation methods" could not really furnish reliable results. Future investigations clearly will need a criterion based on objective evaluations for the influence of alcohol.

At Bratislava, when early official statistics indicated that alcohol was at fault in some 10 per cent of the road

fatalities, it was decided to conduct a study. First, it was considered desirable to establish the number of motorists driving under the influence of alcohol but who did not cause any accident, break any traffic regulations and who drove without noticeable difficulty in normal traffic conditions, both in built-up areas and rural districts. Prior to this investigation, the only studies undertaken were those of Holcomb at Evanston, Illinois, U.S.A., and the work done by Lucas and his associates at Toronto, Canada.

Czech law clearly states the conditions which are necessary for a blood test to be obtained. The person involved is obliged to submit to a responsible doctor for the taking of a blood test provided that it will not endanger his health. In addition, it should be mentioned that the entire Road Transport Service is a state enterprise; this means that the drivers are state employees and, in accordance with Ministry of Transport Regulations, road authorities can take blood tests from them. While it was highly desirable to carry out a systematic evaluation of all drivers during a given period of time even though they had not caused any accidents, private motorists could not be expected to submit to the above requirements.

It was assumed that sober persons would voluntarily allow a blood test to be taken, provided they were informed of the scientific nature of the investigation. In the cases of motorists who had obviously been drinking, authority to take a blood test was permissible under the traffic regulations which, in Czechoslovakia, state that it is against the law to drive after the consumption of alcoholic drink. Every beverage containing over 0.75 per cent alcohol by volume is considered an alcoholic drink, thus even the weakest beer falls into this category. Obviously, a driver who was stopped at a check-point and who had his driver's license with him and did not show any signs of alcohol could not be forced to submit to a blood test. In these cases, where voluntary permission was not obtained, any subsequent action would be considered a violation of human rights and an interference with the liberty of the subject; and these rights are protected by law in every country.

Investigations were carried out in both the urban and rural areas of Bratislava during 1956 and 1957. In cooperation with the Road Safety Department, a preliminary study was made on the density of traffic in the various streets. This preliminary study was necessary in order to determine where checks could be carried out on drivers without causing much waiting or serious economic losses. The traffic at the town center and also in the main streets was so dense in daytime that it appeared impossible to carry out the survey. Even with a large staff of investigators the task appeared insurmountable. Furthermore, it was necessary to have nearby an ambulance and a large area for the parking of vehicles. For these reasons it was decided to undertake the first investigation at night on one of the main roads of Bratislava-Raca, which is a suburb of Bratislava. The nighttime traffic there amounted to approximately 25 vehicles per hour. The road runs down from the lower Carpathian range, a district containing vineyards and wineries, and numerous inns and resort hotels. An ambulance and first aid post was also situated on this road. So that the truest possible picture of the alcohol state of the drivers could be ascertained, the entire investigation was kept secret.

The actual investigation was then carried out in the following manner: Stationed on the road was a patrol which stopped all vehicles, checked driving licenses and requested the driver to take a medical examination. The medical examination took place in a medical reception room without the presence of officials of the Road Safety Department. All drivers were examined and tested according to a previously approved method. After the medical examination was made, then the Hargersch test and blood test were performed. Then the driver went on to the road safety personnel. If he was considered to be drunk, he was prohibited from further driving and was taken home in his own automobile, driven by a relief driver. This method had to be abandoned for reasons clearly shown by the figures.

Due to the excellent cooperation exhibited among the physicians, technicians, and officials of the Road Safety Department it was possible to carry out an examination within five minutes. This time does not include, however, the time spent in dressing and undressing and for the taking of the blood test. Altogether, the total operation took approximately 13 minutes.

The first check took place on a Saturday night so that only a small number of vehicles would be involved. This was done in order to test the procedural operations of all the personnel forming the check group and to improve on the cooperative enterprise. The second check took place on a Tuesday night and traffic was checked between the hours of 10 p.m. and 3 a.m. the following morning. Altogether 113 drivers were stopped. The results are shown in Table 1.

Table 1. Night-time Investigations

	1st check	2nd check	Total	Per cent
Total number of drivers examined	43	70	113	100
Under the influence of alcohol	24	32	56	49.5
Not under the influence of alcohol	19	38	57	50.5

Of particular interest in this investigation was the amount of alcohol consumed daily (Table 2). Only one total abstainer was found—a person who had had one kidney removed in an operation and was shortly going to undergo another operation.

Table 2.

	1st check	2nd check	Total	Per cent
Total number of drivers examined	43	70	113	100
Those who had consumed alcohol within the previous 12 hours	40	55	95	84.1
Those who had not consumed alcohol within the previous 12 hours	3	15	18	15.9

The figures can be subdivided as follows: Of the 56 persons under the influence of alcohol, 35 had between .05 and .10 per cent of alcohol in the blood. Another 12 drivers had between .10 and .15 per cent alcohol in the blood. These latter showed definite signs of being under the influence of alcohol. The remaining motorists, nine in number, were over .15 per cent in their blood alcohol readings, were quite drunk, and were completely incapable of proper driving.

It was thus objectively determined that within one area and on one road that a significant number of drivers had alcohol in their systems while driving. These findings have been used to alert the Road Safety Department of the extent of the possible danger. Later analyses showed that violations of traffic regulations and excessive speed were more frequent in this district than anywhere else in Bratislava. Subsequent to this investigation it was proposd to undertake a day time study. Naturally, it was impossible to use the same method as that which had been used in the nighttime investigation. The frequency of the traffic at the same place was between 371 and 716 vehicles per hour. Consequently, the daytime study had to be undertaken in the following manner: The Road Safety Department first ascertained the hours at which drivers on lorries and public transport vehicles of Bratislava returned to town. In one day, with the cooperation of the municipal authorities, examinations were carried out of all drivers coming into the district between 1 p.m. and 7 p.m. The same methods that had been used in the nighttime investigation were also followed in this case. The results are shown in Table 3.

Table 3. Daytime Investigation in the Town of Bratislava

Total number of drivers examined.....	70	100 %
Under the influence of alcohol.....	8	11.2%
Not under the influence of alcohol.....	62	88.8%

The eight drivers who were found to be under the influence of alcohol had between .09 and .19 per cent of alcohol in their blood.

A total of six checks on various roads within the Bratislava area were made. The purpose of the investigation in this case was not only to ascertain the frequency of motorists driving under the influence of alcohol, but to let it serve as warning to motorists that even outside of the town boundaries there could be a check made at any time. The latter investigation lasted a full day from 6 a.m. to 8 p.m. without a break. Medical examinations and the blood tests were performed in a special vehicle, which had been especially fitted out and placed at the disposal of the investigating group by the authorities. The checkpoint was regularly changed so that the element of surprise would be maintained and to prevent motorists from becoming cognizant of the position of the checkpoint. Each day of the investigation some 100 to 200 kilometers were covered and altogether 348 drivers were examined. The results are shown in Table 4.

Table 4. Daytime Investigation in the Bratislava Area

Total number of drivers examined.....	348	100 %
Under the influence of alcohol.....	40	11.4%
Not under the influence of alcohol.....	308	88.6%

Of the 348 drivers examined, 40 were elated by drink or intoxicated, i.e., 11.4 per cent of the total had between .06 and .22 per cent alcohol in their blood. Comparative findings of the Bratislava study with those of the Evanston and Toronto investigations are presented in Table 5.

Table 5.
ACCIDENT RISK

%	Evanston 1938	Toronto 1952-1953	Bratislava 1956-1957
.03	1	1	1
.031-.099	3	1.5	7
.100-.149	13	3	31
.150—	54	10	128

The frequency of motorists driving under the influence of alcohol in the town and county of Bratislava was about 11 per cent of the daytime. At night it was higher, the highest figure being reached on the road from the Bratislava wine region in the lower Carpathian range. Over ¾ of all those drivers had been drinking within the past 12 hours. Some motorists even had in excess of .20 alcohol in the blood and could be considered completely drunk.

These surveys enabled the investigating team to compile an index number which has been called the *Accident Risk Index*.

In the Evanston investigation mentioned previously, Holcomb, reckoned in terms of the injury risk in 270 cases of road injury accidents which had been taken to the Evanston hospital.

Holcomb's findings are shown in Table 5. However, it should be pointed out that Holcomb made an examination of drivers who were willing to submit to the Hargersch test, which is a breath test and this has to be converted into terms of alcohol content of blood; that is to say, he had to use an indirect method to determine the alcohol content of the blood. Furthermore, it was not possible to account for the drivers who refused to be examined, and it is reasonable to assume that the majority of those who refused had been drinking.

It is better, therefore, to compare the Bratislava survey with the Toronto study which was undertaken by Lucas, Kalow, McColl, Griffith and Smith in 1951 and 1952. This study group compared the influence of alcohol on 423 motorists involved in road accidents with 2,015 drivers who had not been involved in road accidents. Lucas and his associates set up the investigation in such a way that when there was a road accident, four or more drivers passing the spot where the accident took place were asked to submit to breath tests. These tests were analyzed and these drivers were used as a control group. Thus, not all drivers on a road were stopped, but just a sample. The examination was carried out using the Hargersch method and the Alcometer for breath tests. In the Bratislava survey, all drivers on the road were examined during a given period of time. The Hargersch test with some modifications and, in some cases where a positive reaction was given, the Widmark method was also used to determine the amount of alcohol in the blood. The investigations were systematically undertaken and no driver escaped the check.

Czechoslovakia uses the Hargersch test with some modifications. In cases where there is positive reaction, blood tests must be taken; in other words, the test serves only to eliminate persons who have not been drinking. This appears to be of great practical and moral value. The first examinations with the modified apparatus were carried out in 1949. Since then, this test has been used with great

Table 6.

% alcohol in the blood	Control Group: Control group in numbers	Control group in %	Accident Group: numbers Accident group in	% Accident group in	If it were as the control group	Difference in %	Accident Risk Index
.03	370	88.52	123	29.43	29.43	—	1
.031-.099	37	8.85	89	21.29	2.94	18.35	7
.100-.149	8	1.92	82	19.62	0.63	18.99	31
.150—	3	0.71	124	29.66	0.23	29.43	128
	418	100	418	100	33.23	66.77	
					100		

success for the prevention of the consumption of alcoholic liquor. This test has been used not only by the Road Safety Department, but also by the military, Czechoslovak railways, as well as in heavy industry and coal mining.

The survey population was broken into two groups; the first group is called the "control group," and findings regarding this group are shown in Columns 2 and 6 of Table 6. A total of 418 drivers fell into this group and these were people checked between the hours of 6 a.m. and 8 p.m. on given days on given roads. The second group is known as the "accident group" and was the term used for those used of the 418 drivers checked who caused an accident (with or without injury) within the time and area covered by the investigation. Thus, it was possible to take everyone into account, not just the injured who were taken to the hospital which was the procedure followed by Holcomb. All the 418 drivers in the accident group submitted to a blood test taken according to the Widmark method. Findings for this group are shown in Columns 4 and 5 of Table 6.

After compilation of the influence of alcohol in the case of the control group, mathematical calculations were made to derive an index number which was called the *Accident Risk Index*; this is shown in the final column of the table.

These findings are the first to be obtained with a direct method i.e., blood test. Briefly, the following conclusions can be derived:

The limit for the "ability to drive in traffic" up to now has been set as 0.15 per cent. This appears to be far too high. The falling off of ability starts at a much lower level; it appears most conclusive when the alcohol content of the blood is still below 0.10 per cent. It is recommended that a limit of 0.10 or 0.08 per cent should be applied.

Questions now arise which should be not only of interest to those involved in forensic medicine, but also to lawyers; i.e., what is the point where alcohol becomes a menace to road safety? Is it really possible to state a definite amount of alcohol that fits the majority of cases?

Gantner has stated, "Modern traffic demands more and more a driver who can drive his vehicle safely in traffic and who has the ability to judge road conditions at any moment with sufficient accuracy and position. He must comprehend immediately and with unfailing attention what his senses tell him, and act accordingly with correct speed, skill and certainty." To this Elbel adds, "He must not be lacking the definite minimum qualities of a socially conscious person."

If these requirements are agreed to, and the findings of numerous investigators are accepted and recognized, it must be stated that there can be no tolerable limit given for drinking prior to or while driving and the principle must be established: *No alcohol while driving.*

It is the experience of the medical profession that man is not a simple physiological mechanism. If the concession of "just one drink" is made, then people will continue to drink just as before; because "just one drink" is a conception very easy to stretch.

A new survey is now underway using the relatively new apparatus known under the patented name of "Breathalyzer." This is a semi-automatic apparatus with which a trained layman can determine in five minutes the alcohol content of the blood (in per cent) from a sample of breath. Not only is the exact content shown on a scale, but the apparatus itself also records it in red ink on a chart, on which data about the person examined can also be written. Through the use of this apparatus it is possible to pre-sort the blood tests and also to get an exact result immediately. Experience, to date, with this apparatus has been very satisfactory, and there has been good agreement with the results of blood tests given by the Widmark method.

The method does not have the shortcomings which impair other techniques using human breath.

With this apparatus, it is possible to maintain an even better control of the driver, since it is not necessary to have a blood test in every case. It is obvious that the introduction of such a method is greatly effective in preventing drivers from drinking.

Modern traffic and drinking do not go together. It is believed that through this survey it has been objectively established that the least expensive and most effective solution for the prevention of driving under the influence of alcohol is legislation to enforce no alcohol whatsoever while driving and also for a certain time before driving. Authorities would do well to draw this to the attention of the general public.

RAILROAD CROSSING PROTECTION

by T. M. CHUBB

Introduction

In the assumption of responsibilities for public safety, one cannot afford to sit back and wait for a sufficient accident pattern to develop at a railroad grade crossing before anything is done to prevent further loss of life, personal injury or property damage.

Presented herein is a plan which can be used to establish the best and most effective crossing protection wherever it is needed. This presentation will be made through an orderly analysis of the factors which have been considered to improve public safety at railroad grade crossings in the City of Los Angeles.

When Railroad Crossing Protection is mentioned, by common concept, the thought-picture which enters the mind is the familiar Wigwag or some other device installed to protect the railroad whenever a train may be utilizing the track in or adjacent to the crossing.

To start with a proper concept, we must, as will be indicated later, take a much broader view than that of merely protecting the railroad. Because of the sheer mass and fixed course of a railroad train, as compared to an automobile or even a large truck, and also because of the demands of the railroads, it has become the custom for the public to grant to the railroads a special privilege at crossings.

This privelege is not improperly granted; as a matter of fact it would be impracticable, uneconomical and unreasonable to require the railroads to act differently than they presently do at crossings. The railroads have accepted this privilege, but in so doing they must recognize that they have obligated themselves to the responsibilities which go with the acceptance. One of the responsibilities is the obligation to provide adequate protection at the crossings.

The public also recognizes a responsibility to share in the provision of these safety devices.

Railroad crossing protection then becomes the signs, devices and warning indications which must be designed and installed to prevent a conflict between the two types of vehicles, to prevent the destruction of life and property of the two parties desiring to utilize the crossing, to prevent people from inadvertently putting themselves in a position of jeopardy, to expedite the safe movements of trains and highway vehicles, and to enhance the safety of all parties.

To achieve this end, many items must be considered to provide the proper crossing signals, to devise and develop signs and markings which will attract attention and to convey the proper meaning to the public using the crossing. Drivers of vehicles are diverse in their thinking and nearly all who traverse a railroad crossing do so in a different frame of mind. Many are probably less concerned about crossing a railroad track than crossing a signalized intersection, even though a train-vehicle collision usually is much more serious than a vehicle-vehicle collision.

The City of Los Angeles has for many years been vitally concerned with providing the safest and most adequate protection possible at its 767 crossings. This program has, of course, been tempered by the economics of the situation and it has been standard policy to insure that the monies available are spent at those locations where the need is the greatest. This approach, has led to the development of the crossing protection program presently being followed in the City of Los Angeles.

History

Before describing this program, however, a review may be helpful. In 1830 the first passenger railroad operation in America was started with horse-drawn rail cars. In these early days, the emphasis was placed on warning the public of the presence of a railroad. Later, to enhance public safety, protection at hazardous crossings was expanded to include the warning of the approach of a train by a human flagman. Automatic warning became possible following William Robinson's invention of the track circuit in 1872.

In spite of the warnings, accidents at railroad crossings plagued the public and the railroads throughout the history of railroads in this country. An 1878 Report of railroads in this country indicates that there were 191 grade crossing accidents, resulting in 98 deaths in Massachusetts during a seven-year period. Even in 1890, when vehicle traffic was exclusively horse-drawn, there were 402 persons killed and 675 injured in grade crossing accidents in the United States. With the introduction of the automobile about 1893, the problem became more acute.

To overcome this unnecessary destruction of life and

property, many devices have been invented and tried over the years. These range from the simple warning device such as the crossbuck on the side of the road to barriers that vehicles could not break through. For example, in 1921, a yielding highway barrier consisting of wire cables supported horizontally between two steel posts was installed in Chicago. It was equipped with counter weights to bring a vehicle to a stop within 30 feet after hitting the barrier. This device, together with advance warning signals, was at one time approved for installation in Los Angeles County, but it was never installed.

Approximately ten years ago, the City of Los Angeles sponsored some experimental tests, using photo-electric and electro-magnetic devices in an effort to develop improved and more economical crossing protection control for the electric railway lines in this area.

The Problem

Throughout the years, the crossing protection has taken many forms and, today, crossing protection has become most complex. This has been brought about, among other things, by human failures and the inconsistency of people to respond to devices installed for their welfare. We now not only warn the travelling public of a crossing and the approach of a train, but we attempt to prevent the user of the street from disregarding his own safety and welfare and moving into a position of hazard. Another essential part of modern crossing protection is to provide for the escape of persons who may be stopped on the track because of traffic or other hindrance.

Crossings located adjacent to street intersections which have traffic control signals present an additional problem. Since railroad operation has been afforded the right to pre-empt the highway traffic signals, crossing protection signals at such locations must be so interconnected with the traffic signals as to afford safety to the railroad for its privileged movement. On the approach of a train and during the pre-emption period, the traffic signals should complement the crossing protection and must not show an indication to the motorist that invites or even allows a movement that is contrary to the crossing protection signal. This coordination of the traffic signals requires that the traffic signals be so designed that they will operate on a special cycle when a train approaches the crossing.

In other words, crossing protection planning must be given full treatment and requires the combined knowledge of the railroad engineer, the traffic engineer, and the public utilities engineer.

Regulations and Standards

The Public Utilities Code and the General Orders of the California Public Utilities Commission establish certain general requirements for the types of protection to be installed at railroad crossings. The California Vehicle Code also establishes definite requirements, such as placing advance warning signs, and gives sanction to enforcement of crossing protection indications. In addition, railroads adhere to the standards of the Association of American Railroads as to type and quality of devices and, to a great extent, for the specific design of crossing protection installations.

These authorities are frequently studying and upgrading their requirements to stay abreast of changing traffic conditions. General Order 75B of the Public Utilities Commission relates to crossing protection and is the basic standard for such installations in California. The staff of the Commission is now considering revisions of that Order which will modernize it and bring it in line with present-day needs and practices. The Association of American Railroads' Bulletin No. 5 was adopted as standard in 1956; however, standing committees are continuously studying improvements to this standard. It is only by a continuing active participation in railroad crossing protection and coordination programs that the public can be assured that any changes which are made in these various regulations and standards will be changes that benefit all parties concerned.

Los Angeles Program

In the City of Los Angeles, the responsibility of coordinating and expediting all of the various activities and interests concerned in a crossing protection and/or coordination installation lies in the Department of Public Utilities and Transportation. Within this Department of the City, there are Public Utilities Engineers devoting substantial portions of their time to this important matter. These men are engaged in all phases of the Crossing Protection Program, including some research work which will be referred to later.

The City of Los Angeles is constantly endeavoring to improve its crossing protection program and facilities. This requires a nearly continuous program of inspection of all crossings to keep signs and pavement markings sufficiently distinct. A check is also made for the presence of railroad crossbucks, advance warning signs, and now "Stop Exempt" signs which the Public Utilities Commission has recently authorized for placement on advance warning sign standards at spur track grade crossings.

There is a continuous program to inspect crossings and evaluate the need for improved protection. Every crossing, including spur tracks, is inspected by City and Public Utilities Commission engineers at specific intervals. Deficiencies of paving, protection and other public safety items are noted and corrected. Each crossing which may be eligible for automatic protection is noted, and a separate and more complete investigation is made. During this investigation, specific information is recorded on a form, a sketch of the physical conditions is made, and photos of the crossing taken. (Table I) These data are available for each Class "A" crossing and many less important crossings in the City. These crossings are reviewed at least once each two years to assure the maintenance of an up-to-date record.

Major effort, however, is spent devising improved protection at those crossings where streets are being improved, where conditions are changed by the growth of the City, or where there appears to be unusual hazard because of complaint, an adverse accident record, or change in the development of an area that might substantially change the traffic volume and increase the probability of possible conflict. Included in this effort is the proper coordination of traffic signals at nearby intersections with rail operations.

It is not considered necessary to change-out older automatic devices just because they are no longer modern, but rather, an attempt is made to spend crossing protection dollars where the greatest hazards can be eliminated with the money available.

As of June 1959, there were 767 crossings in the City of Los Angeles, of which 222 were protected with automatic crossing signals. In use are many types of protection (see Table II), including wigwags, center of the street flashing lights, edge of the roadway flashing lights, flashing lights on Cantilever arms, automatic gates and coordination with several types of clearance cycles. Each installation completed in recent years has been designed primarily to provide the most effective protection in light of the particular conditions at the particular crossing where it is installed.

There are also several installations where traffic signal heads have been assembled for use as automatic advance warning signals which have proven to be very effective in accident prevention. At the recently opened grade crossing of Roscoe Boulevard across the Southern Pacific Coast Line tracks in the San Fernando Valley, fully equipped crossing protection facilities were installed. At this crossing there are automatic advance warning signals, Standard No. 8 flashing light signals on the side and in the center of the street, automatic crossing gates, special illumination and a raised traffic divider.

While other cities or jurisdictions may not have as many crossings, and many may not be as complex or as heavily used as some in the City of Los Angeles, certainly there are many which are just as important. In jurisdictions where there are few grade crossings, the problems may not at first seem as complex as in the City of Los Angeles. The fact is, however, that these crossings all have the same factors, to one degree or another, and should be given the same evaluation and consideration in order to provide the maximum safety to the public.

Factors

It is obvious that there would be an economic waste if we were to set out to provide automatic crossing protection at all crossings. Crossings may vary from unimportant spur tracks across minor industrial streets or alleys to crossings of important main line railroad track across major multiple-lane highways carrying high density traffic 24 hours a day. We must, therefore, first get an over-all picture of the crossing protection needs.

For years too many engineers and others responsible for crossing protection installations have been prone to look only at the accident record of a crossing to determine the need for protection. Certainly, the accident record is an indication of the hazards at a particular crossing under conditions as they existed in the past. However, public officials cannot wait until a number of persons are killed at a particular crossing before a decision is made to install automatic gates or some other devices to prevent such accidents. Instead, it is necessary to take an affirmative approach to determine the factors that cause the crossing of a railroad to be hazardous. The evaluation of these factors will determine the relative need for improvement in the protection and establish the relative safety or conversely, the relative hazard of the several crossings under consideration. It is through these relationships that a system of priorities can be developed for the orderly economic improvement of all crossings.

This idea of developing a system of priorities has been considered by many individuals or groups, with the result that there have been numerous formulae developed and used to evaluate various factors and to develop the relative hazard potential at various crossings. Some have been applied in quite a comprehensive manner, but each arrives numerically at a priority rating for various crossings.

Many of the factors included are subject to a quantitative evaluation; i.e., we can count the number of vehicles crossing the tracks; we can count the number of trains crossing the highway; and we know the circumstances and number of accidents that have occurred at each crossing. Similarly, other factors may be definitely evaluated. There are, however, other factors which are more intangible. These, such as the amount of illumination, distractive influences, and visibility are just as important as the others, but these are things that have not been subject to exact measurement. As a consequence, various engineers have placed different emphasis on each of the factors.

We recently made a comparison of eight recognized formulae. The priority ratings of hazard indices were computed by each formula for 25 grade crossings in Los Angeles which are now being considered for improvement. (Table III identifies the formulae and shows the relative priority ratings developed by the computation.) The composite of all formulae was determined by the arithmetic average of all rankings.

It is of interest to note that the formula developed by the California Department of Public Works and the Public Utilities Commission, and used in their report entitled, "Grade Crossing Situation of Public Streets, Roads and Highways, with Some Steam and Electric Interurban Railroads in the State of California," dated December 1, 1932, is one of the least complicated and yet gave results most consistent with the composite. In this formula, the Rating or Hazard Index Equals: Rail Traffic times Highway Traffic times the Number of Accidents during a five-year period times a Crossing Protection Factor.

Certainly, no political jurisdiction has more money to spend than it knows what to do with, and so development of such a program will assure the spending of what money is available in the locations where it will do the greatest good from the public safety standpoint. Likewise, the railroads have a real and tangible interest in these same objectives.

The development of a priority rating is a useful tool and is highly recommended; however, the final decision as to the most appropriate crossing at which an installation is to be made must be based on the further evaluation of the specific requirements and special conditions at each crossing.

Factors which are used in the various Hazard Index formulae are still most important, but must be considered in the light of the special circumstances at a particular crossing. Foremost among these are:

1. Special types of traffic, and expected increases
2. Speed of train operations
3. Effectiveness of present protection (accidents)
4. Visibility factor
5. Special physical conditions in vicinity of crossing
6. Distractions

Table IV lists other items considered at each investigation in evaluating the need of the crossing protection improvement, whether such investigation was instigated by continuous inspection and evaluation of crossing protection needs or because of a special investigation or accident occurrence.

These items vary in importance, and in many instances the same item may be important in one crossing evaluation and much less important in another. There are, of course, some factors that always remain important. For instance, there should always be a high degree of crossing protection where important streets carry high volumes of traffic across railroad tracks and where there are regular and frequent train movements. The visibility factor when considered in the light of the ability of the motorist to see and to safely evaluate the need to stop to prevent collision with an approaching train takes on added significance at a very definite distance. Chart "A" entitled, "Time, Distance, Speed," is an aid in learning if the obstructions will impair the visibility of an approaching train to the vehicle driver.

Some explanation of this Chart may be advisable at this point. It was assumed that the visibility factor became important when a driver cannot see an approaching train in time to safely evaluate the situation and, if necessary, stop for the train. The stopping distance, based on Vehicle Code minimum braking requirements, plus a three-second perception-reaction and brake-lag time for vehicular traffic was plotted for various speeds on the Chart. Based on predetermined maximum vehicle and train speeds, the approach distance for the vehicle and train can be determined on the Chart. Thus it is obvious that material obstruction to the motorist's vision of the train at this approach distance would increase the need for automatic crossing protection.

Evaluation and Use of Factors

By consistent evaluation of the factors observed during the field investigations plus the other factors shown in Table IV, it is believed that a final answer can be properly made as to the need for additional or improved crossing protection.

Determination of the appropriate type of crossing protection requires further study of the same set of data. In many cases, even this determination may be controlled by intangible factors; for instance, we may have a crossing protected by wigwags which is every bit as important as a crossing that is being opened or improved. It may not be appropriate to upgrade the crossing protection of the existing crossing from wigwags to the more modern flashing lights, yet it would be equally improper to install the obsolete wigwags at the new crossing. Thus, there may be several crossings of relatively equal rating, but without the same crossing protection.

It is further believed that there are certain definite criteria, each when taken itself generally warrants the installation of a certain standard of protection. Crossing gates should be installed at all major highways where there are multiple track crossings of a main or important branch line. This is particularly true when there are great variations of train speed, or where there is a chance for rail cars to be stopped on one track while a through train passes by on the hidden track.

Usually, high speed railroad lines, in developed areas, should be protected by crossing gates. For example, we are urging upgrading of the protection to crossing gates at all crossings along the Southern Pacific Coast Line over which trains travel at speeds up to 80 miles per hour in the intensely developed, urbanized San Fernando Valley.

The installation of raised traffic separation strips on the approach to grade crossings should be universal where there is high-speed operation.

In some instances, we must reach the conclusion that there is not satisfactory crossing protection for a grade crossing. Any devices or schemes available which could result in thoroughly satisfactory safety at these unusual locations would create intolerable traffic conditions or would be unacceptable to the public. Here, we look to grade separation. The complex crossing and intersection—Southern Pacific Coast Line, Laurel Canyon Boulevard and the offset Sherman Way—is an example where we have provided as much safety as we can without creating an intolerable traffic bottle-neck. The next step, and we hope soon, is grade separation.

Coordination of traffic signals with train operation is practically mandatory where traffic signals must be installed within 200 feet of a rail crossing. Under certain conditions, coordination should be made at even greater distances.

Cost Factors and Comparisons

All of the factors and considerations with which we have dealt up to this point have been outside of the economic impact of the relative costs involved to accomplish the desired results. Certainly, this is an important factor to be considered and which must be evaluated in light of the need for the expenditure of monies available for other important traffic control installations as well as many other governmental functions. To shed some light on this phase of the problem, there is shown in Table V some recent unit costs for installing various types of crossing protection.

This subject of the relative economic justification of railroad crossing protection installations versus other traffic control and safety installations is a broad subject which should be the subject of a separate analysis. Suffice it to say that the City of Los Angeles believes that the cost of crossing protection is thoroughly and properly justified by the record of lives saved and the substantial reductions in injuries and property damage.

Results Obtained

By following a program for crossing protection improvements as herein indicated, we have been able consistently to reduce accidents at grade crossings in Los Angeles. A study involving the investigation of approximately 400 crossing years experience indicates that by the installation of No. 8 flashing light signals and the coordination of traffic signals with railroad operation, it has been possible to reduce accidents experienced by 76 per cent and to reduce the fatalities more than 85 per cent. Table VI gives a more complete analysis of the effectiveness of various crossing protection improvements, all of which indicate a significant reduction in accidents. Studies made by other agencies indicate similar public safety improvement by the installation of automatic crossing protection.

TABLE I

BOARD OF PUBLIC UTILITIES AND TRANSPORTATION

RECORD OF RAILROAD GRADE CROSSINGS

Company _____ Line or Branch _____ Crossing No. _____

Name of Street _____ Between _____ and _____

Physical Data

Main ____ Br. ____ Pass. ____ Side ____ Spur ____ Y ____

On P R/W on Street _____ Steam or Elec. _____

Cut or Fill ____ ft. Grade ____-____% ____-____%

____-____ ft. (tan.) (curve) ____-____ ft. (tan) (curve)

Xing width ____ ft.; Condition _____

Approach width ____ ft. Condition _____

Angle of Xing ____°; Appr. Grde. ____% ____%

Intersecting St. ____-____ ft. ____-____ ft.

Weather factors _____

Corner Views

N.W. _____ N.E. _____

S.W. _____ S.E. _____

Remarks:

Protection Data

Std. No. 1 Signs _____ Properly located _____

Std. No. 1A Signs _____ " " _____

Std. No. 2 Signs _____ " " _____

Blvd. Stop Signs _____ " " _____

Advance Signs _____ " " _____

Pvmt. mkgs. "RXR" _____ Dbl. Cl. Lines _____

Auto. Sigs. No. _____ Location _____

Type of Signal _____ Type of Circuit _____

Lgth. of Circuits ____ of Xing ____ ft.; Xing ____ ft.

Human flagman _____ Hours _____

Crossing gates _____ " _____

Traffic Signals _____ " _____

Type of coordination _____

Illumination _____

Remarks:

SYMBOLS

Illum
Traff

Sigl
Contl

Box
Stop

Sign
Advance

Sign
No. 1
No. 2
No. 3
No. 4
No. 5
No. 6
No. 7
No. 8

Gates

(Crossing Sketch)

Highway Traffic

Vehicles per day _____

Pedestrians per day _____

Data from _____ Date _____

Principal traffic — Through — Local

Speed restrictions _____

Remarks:

Railroad Traffic

Trains: No. Speed

Passenger _____

Freight _____

Switch _____

Light Engine _____

Speed restrictions _____

Switching restrictions _____

Remarks:

Field by: _____ Date _____

T-26-53

(Based on C.P.U.C. FORM A, B, or C)

Further Studies

This field of crossing protection is a dynamic one in which we are learning each day. Since the end of World War II, there have been many developments in the field of traffic control and specifically in this matter of crossing protection. As a result, there has not been sufficient factual data developed to show the most effective type of installation. Therefore, at the present time, the City of Los Angeles has a study under way, with the cooperation of the Institute of Transportation and Traffic Engineering, to attempt to evaluate the reaction or obedience of drivers to various indications at railroad grade crossings, particularly in connection with coordination of traffic signals with railroad operations. Also, we are experimenting with photographing intersections and crossings from vantage points. It has been determined that the traffic pattern that develops during the approach time portion of the crossing protection operation can be evaluated from a series of pictures taken at approximately one-second intervals. This photographic project is being continued and, in addition, we are considering the use of multi-pen recorders in order to gather complementary data at various locations under specific situations. This entire research project is an ambitious undertaking as it will encompass the incorporation of most of the various factors we have here discussed.

Conclusion

It might be helpful to summarize the various things that have been discussed to accomplish the improvement of crossing protection for the enhancement of public safety. First, a priority list should be developed by the use of a recognized formula to insure the orderly development of a plan for improvement crossing protection. This plan should be consistent with those of other jurisdictions.

Next, proposed installations of crossing protection should be made upon facts developed by field inspections of the individual crossings. The most important factors for consideration are conflict (train and vehicle movement), visibility, distractions, unusual physical conditions, and accidents. The other factors which have been indicated, such as special types of traffic, train speeds, activity of trains at the crossing, and the several other factors indicated in Table IV must also be considered and evaluated. Certain installations may be made based on one factor alone such as the requirement for automatic protection at a high-speed railroad line.

Lastly, coordination of traffic signals with railroad operation is also necessary when the railroad crossing is located close to or adjacent to a signalized street intersection.

TABLE II

CITY OF LOS ANGELES DEPARTMENT OF PUBLIC UTILITIES AND TRANSPORTATION TYPES OF CROSSING PROTECTION

The following types of automatic crossing protection existed in Los Angeles in 1958:

Crossing bell

Upper quadrant wigwag, street edge and street center types

Lower quadrant wigwag, at street edge

Enclosed lower quadrant wigwag, light flashing on when disc is at extremity of swing, at street edge

Flashing light with rotating stop banner, at street edge

Flashing lights, street edge and on median strip

Flashing lights with cantilevered overhead set of flashers at street edge

Flashing lights with automatic gates at street edge

Flashing lights mounted on vertical axis rather than horizontal

Supplemental flashing lights on street edge upper quadrant wigwag

Supplemental 4-lens STOP indicator, spelled out vertically along upright by black letters on amber lens

Two train indicator

BASIC METHOD OF TRAFFIC SIGNAL OPERATION WHEN PRE-EMPTED BY TRAIN MOVEMENTS

The clearance interval at crossings may vary from zero to 20 seconds and is shown in the basic plan. At many crossings, a nearside traffic signal is installed at the crossing approach which supplements the automatic crossing protective signal. In a few cases, a three-second amber period follows green.

1. All signals display solid red.
2. All signals display flashing red.
3. Crossing signals display flashing red; parallel signals, flashing amber.
4. Crossing signals display solid red, parallel signals, solid green. (Variation—train enters intersection on green and holds until train clears intersection.)
5. All signals display solid red with green arrow for parallel traffic.
6. Crossing approach signal displays solid red, leaving signals display (0-20) seconds of solid green clearance period, then solid red. Parallel signals, solid red.
7. Crossing approach signals display solid red, leaving signals display (0-20) seconds of solid green clearance, then solid red. Parallel signals solid red with green arrow displayed at end of clearance period.
8. Crossing approach signals display (0-20) seconds solid red and then display flashing red. Leaving signals display (0-20) green clearance period, then display flashing amber. Parallel signals (0-20) solid red, then flashing red.
9. Railroad crosses two streets near one intersection. Street "A" crossing approach signals display solid red; leaving signal flashing red. Street "B" crossing approach signals display solid red; leaving signal flashing amber.
10. Crossing signals display flashing red. Parallel signal 20 seconds solid red, then flashing red.

TABLE III
CITY OF LOS ANGELES
DEPARTMENT OF PUBLIC UTILITIES AND TRANSPORTATION
Comparison of Relative Priority for Crossing Protection Improvements As Developed by Various Formulae

		Formula Identification								
		1	2	3	4	5	6	7	8	COMPOSITE
		RELATIVE POSITIONS								
Vineland	E-459.6	1	3	2	3	2	2	2	2	1
Sunland	B-467.8	3	2	1	4	5	1	1	1	2
La Cienega	6A-10.03	17	1	4	1	6	9	4	3	3
La Brea	6A-9.05	8	12	5	7	4	4	3	4	4
Balboa	E-451.8	14	5	7	2	1	6	5	7	5
Figueroa	6R-12.17	2	8	3	12	9	7	7	5	6
Woodley	E-452.9	16	10	10	5	3	5	6	8	7
Central	6A-3.27	12	4	6	8	8	8	9	9	8
Osborne	B-464.5	5	17	13	6	7	3	8	6	9
Central	2H-3.5	18	6	8	13	14	12	11	13	10
Hoover	2H-5.3	13	14	15	10	11	11	10	12	11
San Pablo	B-484.0	9	7	12	15	16	14	18	15	12
Pierce	B-463.6	4	19	16	13	18	10	12	10	13
Vermont	2H-5.6	22	9	17	9	10	13	13	14	14
Avalon	2H-4.1	21	15	19	11	13	15	15	11	15
Hill	6A-4.45	10	16	9	17	17	18	17	19	16
Boca	B-485.0	6	18	11	20	21	16	19	17	17
Coldwater Can.	E-457.0	15	13	23	16	15	17	14	16	18
Lindley	E-450.4	24	11	18	14	12	19	16	18	19
Oxnard	BY-459.5	7	22	14	21	20	20	20	20	20
Winnetka	BY-451.3	11	23	24	22	22	22	21	21	21
Woodman	BY-459.4	25	21	22	10	19	21	22	24	22
Hope	6A-462	20	20	20	24	25	24	24	22	23
Lindley	BY-453.9	19	25	25	23	23	23	23	23	24
Wilbur	BY-452.9	23	24	21	25	24	25	25	25	25
Maximum		+14	+ 8	5	+ 6	+ 5	+ 6	+ 6	+ 3	
Deviation		—13	— 8	— 7	— 4	— 7	— 6	— 4	— 4	

Formulae Used in Comparing Relative Priority Rankings

1. Public Utilities Commission Accident Formula (5 Year Basis)
   $IH = (1 \times A) + (1 \times I) + (2 \times K)$
2. Illinois Commerce Commission (Warren Henry)
   $IH = VR\,(1 + Q + A_c + U)$
3. City of Detroit (Adapted to California Conditions)
   $$IH = \left(\frac{V}{1000}\left(\frac{P}{10}+\frac{T}{20}+\frac{S}{30}\right) + Q + N + C\right)\left(\frac{100\% - G}{100}\right) + A$$
4. Federal Aid Highway Deficiency—Also Used by Public Utilities Commission as Traffic Factor Formula
   $IH = VR/1000$
5. Los Angeles Grade Crossing Committee
   $$IH = \frac{V}{1000}\,(P + 10\,(T + S))$$
6. Public Utilities Commission Composite
   $$IH = \frac{V}{1000}\,(2R_1 + R_2)\,(M_1)\,(A)\,(G)$$
7. State of Oregon (1941)
   $IH = VR\,(U_s + R_s)\,(1 + A)$
8. California Department of Public Works and Public Utilities Commission.
   $IH = V\,R\,A\,G$

Legend for TABLE III

IH	Index of Hazard.
V	Number of vehicles traversing the crossing in a 24-hour period or rating factor.
R	Number of trains traversing the crossing in a 24-hour period or rating factor.
P	Number of passenger trains traversing the crossing in a 24-hour period.
T	Number of through freights traversing the crossing in a 24-hour period.
S	Number of Switching movements traversing the crossing in a 24-hour period.
R_1, R_2, and R_3	Number of trains per day exceeding 25 miles per hour, number of trains per day traveling at 25 miles per hour or less, and train speed factor.
M_1	Number of Main line tracks.
N	Total number of tracks or rating factor.
Q	Quadrant visibility factor.
A	Accidents or accident factor.
G	Existing crossing protection factor.
C	Road condition factor.
U	User factor.
A_t	Attention or distraction factor.
I	Number of persons injured.
K	Number of persons killed.

TABLE IV

CITY OF LOS ANGELES DEPARTMENT OF PUBLIC UTILITIES AND TRANSPORTATION

Crossing Protection Improvement Considerations

Train-Vehicle Accidents
- Time of Day
- Severity (Killed or Injured)

Capacity of Crossing for Vehicles
- Peak Hour Use
- General
- Crossing Width Compared to Approach Widths

Predominant Use of Crossing
- Fast Traffic
- Slow Traffic
- Main Artery
- Remote from Adjacent Crossing

Type of Vehicle Traffic
- Predominately Local
- Commercial Vehicles
- Through Vehicles
- Transit
- School Bus
- Hazardous Cargo

Activity of Trains Using Crossing
- Fast Trains
  - Passenger
  - Freight
- Switching Movements

Visibility of Trains from Approaches
- Sight Distance by Quadrants
- Obstructions
- Acute angle approach

Civic Groups' Requests
- Magnified Hazards
- Political Influence

Distracting Influences

Present Development
- Zone
- Type of Use
- Amount

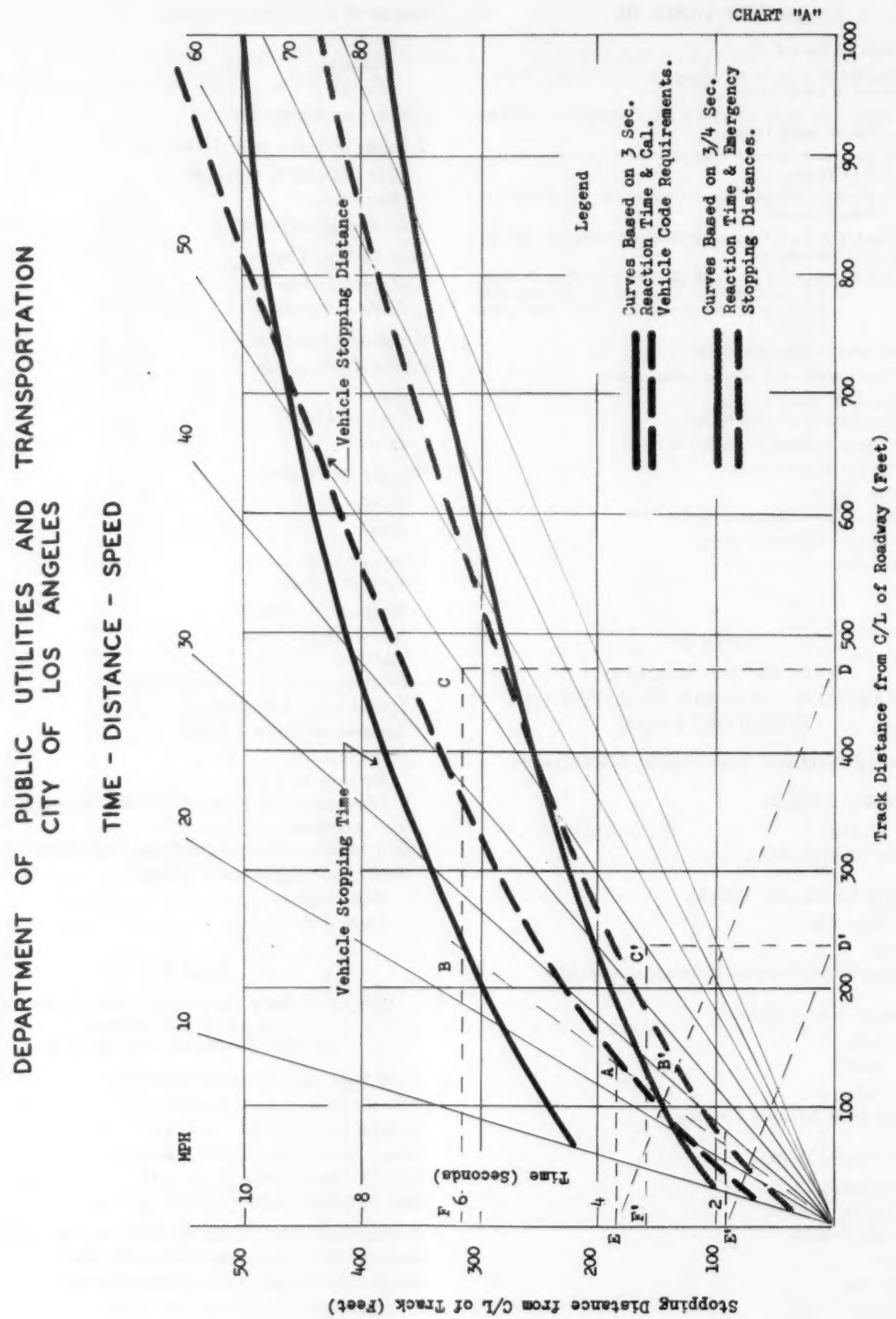
Planned Development
- Streets
- Area

Protection Requirement
- View of Signals
- Width of Approaches
- No. of Traffic Lanes
- Elevation of Tracks
- Proximity of Adjacent Intersection
- Special Street Configuration
- Location of Crossing Signals
- Street Lighting
  - Intensity of Lights
  - Illumination of trains in Crossing Presented to Each Approach
- Interference of Business Lighting, Neon Signs, etc.
- Background Lighting of Crossing
  - Street Lights
  - Lighted Advertising

TABLE V

DEPARTMENT OF PUBLIC UTILITIES AND TRANSPORTATION CROSSING PROTECTION COST

Fixed Signs and Pavement Markings	Cost Each
Advance warning sign, installed	$ 25.00
Reflectorized crossbuck, installed	61.00
Double white clearance lines, per set	10.00
RXR Pavement markings, per lane	10.00
RXR Pavement markings, plastic, per lane	50.00
Automatic Devices (Control Circuit Not Included)	
Standard No. 8, pair, foundation, and guards	1,000.00
Standard No. 8, pair, with additional flashers on 12-foot arms, foundation and guards	3,100.00


DEPARTMENT OF PUBLIC UTILITIES AND TRANSPORTATION
CITY OF LOS ANGELES
TIME - DISTANCE - SPEED
CHART "A"
Legend
Curves Based on 3 Sec. Reaction Time & Cal. Vehicle Code Requirements.
Curves Based on 3/4 Sec. Reaction Time & Emergency Stopping Distances.
Vehicle Stopping Distance
Vehicle Stopping Time
MPH
Time (Seconds)
Stopping Distance from C/L of Track (Feet)
Track Distance from C/L of Roadway (Feet)

Flashing Lights, pair, supplemented with gate arms, foundation, guards, and additional power supply	6,870.00
Signalization of intersection, traffic signals, conduit, labor, controller, power supply, each intersection	10,000.00
Interconnection between railroad circuits and traffic signal controller	150.00

Control Circuit Protection

Single-Track Flashing Lights	$ 2,700 to $ 8,900
Multi-Track Flashing Lights	5,100 to 9,200
Single-Track Gates	20,900 to 22,700
Multi-Track Gates	21,400 to 32,000

These costs are based on the latest available estimates as furnished by the various railroads and the Department of Traffic.

TABLE VI

CITY OF LOS ANGELES DEPARTMENT OF PUBLIC UTILITIES AND TRANSPORTATION

Accident Reduction by Installing No. 8 Flashing Lights or No. 8 Flashing Lights Plus Coordination of Traffic Signals in City of Los Angeles

No. of Xing		Type of Protection	Xing Years	Accidents No.	K	I	per Xing Yr.	% Acc. Reduction
9	Before	Auxiliary	40	25	2	14	0.62	
	After	No. 8 Flash. Lgt.	50	3	0	0	0.06	90.3
6	Before	Auxiliary	41	22	1	14	0.53	
	After	No. 8 Flash. Lgt. plus Coord.	19	1	0	4	0.05	90.5
3	Before	Coord. of Traffic Signals	8	9	0	0	1.08	
	After	No. 8 Flash. Lgt. & Coord. of Signals	22	6	0	0	0.28	74.1
20	Before	Wigwag	138	177	7	54	1.28	
	After	No. 8 Flash. Lgt.	62	28	1	6	0.45	64.8
2	Before	Wigwag	16	12	1	4	0.74	
	After	No. 8 Flash. Lgt. & Coord. Traffic Signals	4	0	0	0	0	100.0
40	Before	Total	243	245	11	86	1.00	
	After		157	38	1	10	0.24	76.0

DEPARTMENT OF PUBLIC UTILITIES AND TRANSPORTATION CITY OF LOS ANGELES

How to Use Time, Distance, Speed Chart

Problem:

At a railroad grade crossing with roadway perpendicular to the crossing, a building is located 75 feet from the centerline of roadway and 100 feet from the centerline of tracks. Roadway maximum speed is 25 MPH and maximum train speed is 50 MPH. Is visibility adequate?

Solution:

Distance in advance of crossing motorist must be able to see train:

Point "A" is determined by intersection of 25 MPH line with vehicle stopping distance curve. Point "E" or 184 feet is determined by drawing a horizontal line to vertical axis.

Stopping time in advance of crossing motorist must be able to see train:

Point "B" is determined by intersection of 25 MPH line with vehicle stopping time curve. Point "F" or 6.4 seconds is determined by drawing a horizontal line to vertical axis.

Distance train from crossing traveling 50 MPH:

Point "C" is determined by drawing a horizontal line from Point "F" to the 50 MPH line. Point "D" or 469 feet is determined by drawing a vertical line to horizontal axis.

Line of sight required:

Draw line between Points "E" and "D" and plot in corner of building using horizontal and vertical scale.

The corner of the building is below the line of sight line, and the train would not be seen at an easy stopping distance from crossing.

Answer:

Visibility is inadequate.

Line E′-D′ is the line of sight similarly determined for emergency stopping assuming the pavement is dry, the vehicle has good brakes, and driver has fast reaction.

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A New Approach to the Analysis of Accident Distributions

by Robert P. Shumate

In this paper I shall discuss two separate yet closely related matters. The first is a method of determining and predicting motor vehicle traffic accident distributions on a street or highway network. The second deals with the mechanics of the method, in connection with which I shall illustrate an application of modern computers to this type of problem.

Most accident prevention activities, such as enforcement, are based on advance predictions of where and when accidents will occur. If such predictions are reasonably accurate, preventive activities can be directed at those points in space and time where most accidents will occur. The predictability of accident distributions has been demonstrated frequently enough to be accepted as an established fact. Thus we now turn to consideration of the most efficient and reliable technique for making the predictions.

In both theory and practice the prediction of future accident concentrations is based upon the behavior of accidents in the past. This is another way of saying that what we observe about where accidents happen this year will probably prevail substantially next year. This is not to say that if we observe an accident at 2:00 p.m. on Thursday, November 12, at 8th and Elm Street, we will observe precisely the same occurrence next year. What it does say is that, if we have twenty accidents at 8th and Elm over a period of a year, it is very likely that we will have somewhere between 16 and 24 accidents at this location during the next year.

One point frequently overlooked in discussions of accident predictability is that we are primarily concerned with relative distributions rather than absolute numbers of accidents. Perhaps the simplest way to illustrate this is to compare four theoretical sections of a city for different time periods, a year against a month.

Area	A	B	C	D	Total
Year	40	10	30	20	100
Month	4	1	3	2	10

If we examine the numbers of accidents in each area for the different time periods, we find quite wide differences in the absolute numbers involved. However, when we reduce the absolute value to the per cent of the total in each area we find the relative distribution to be the same for both the yearly and the monthly period.

A	B	C	D
40%	10%	30%	20%

Relative distributions are important because they permit, among other things, equalization between time periods of different length and areas of different size.

We may illustrate what is meant by equalization through the use of a simple situation unlikely to be encountered in real life. Let us take two sections of highway identical in respect to their physical construction except that one is 2 miles long and the other 1 mile. Assume that these two sections of highway are located adjacent to each other and that during the month of June exactly the same number of drivers pass over each section. In the normal course of events we would expect that the 2 mile section would produce twice as many accidents as the 1 mile section by virtue of the fact that each driver spends twice as much time and drives twice as far on the 2 mile section.

If we attempt to compare these two sections for the purpose of selecting which had the highest accident density, we must take into account the fact that one is twice as long as the other. Perhaps the easiest way of doing this is to reduce their accident experience to the number of accidents that occur per mile of highway which makes the two sections equivalent for comparative purposes.

While equalization of this type does not take into consideration other factors, such as volume of traffic, difference in physical design characteristics, and the drivers on different sections of highway, in a sense it cancels out the obvious (difference in length) so that the other factors stand out more clearly. Methods of equalizing accident experience are useful primarily in cutting down the amount of time involved in following down false leads which cannot even when isolated suggest action to be taken.

Any useful application of past accident distributions is, of course, predicated upon their reliability as a predictor of future distributions. The fact that accidents occur in repetitive patterns over time and in areas has been recognized since as early as 1930. On the basis of this fact, many practical, workable applications have been developed. The assignment of police manpower by time of day and by location is one example of these applications. Moreover, locations with more than their proportionate share of accidents can be selected for engineering studies. The technique of enforcement on this basis has gained considerable recognition under the general term "selective enforcement."

While the repetitive patterns that accidents follow involve numerous factors, including location, time of occurrence, type of occurrence, and units involved, we will limit our discussion to techniques for studying distributions on an area basis. A useful and economical device for observing distributions of accidents on an area basis which has been used extensively for many years is the spot map. Accidents are represented by pins stuck into a large scale map. As more and more accidents are accumulated areas

with a high density of accident begin to show up as clusters of pins. Thus an overall picture of the distribution of accidents may be developed for the time period under examination. While this technique has proved its usefulness it has some drawbacks, however. These are:

1. The evaluation of accident distributions is somewhat impressionistic particularly for locations that have marginal accident densities.

2. Changes from one time period to another must be remembered.

3. The interpretation of what the map portrays is somewhat subjective.

4. The time involved in maintaining such maps may be excessive if the area is large or the accident experience high.

Until recently no other method was available that would permit regular periodic evaluation of accident distributions by area with a reasonable expenditure of manpower and money. With the advent of modern digital computers this limitation has been eliminated.

In the early fall of 1959 the research section of the Field Service Division of the International Association of Chiefs of Police completed development of an experimental program for analyzing accident distributions by location on a statewide basis. Subsequently the program was tested, and slightly modified, and is now being used by the Wisconsin State Patrol.

The objective of the program was to make possible the selection of high-density highway segments by a completely objective, quantitative method.

The means of accomplishing this have been known for some time. It is necessary to classify the system under study into a group of highway segments and compute a rate of accident occurrence for each segment. If the method of rate computation is sound in basis, we have both a means of comparing the relative accident density of different segments as well as changes that occur within a given segment over a period of time.

The mechanics of such a plan were considered for some time, but the amount of work involved, if computations were to be done by hand, was too great to be considered. Finally the process was reduced to a form which could be handled by an IBM 650 medium speed digital computer.

Basic Computational Methods

The entire highway network of the state is divided into a series of relatively small segments. In theory any size segment of highway may be used from ¼ mile to a hundred miles in length. As a matter of convenience, the unit selected in this case was the distance the highway ran through a single township. The average township segment in Wisconsin is about 6 miles in length. Each numbered highway in the state is sectionalized into township segments. Where a single highway carries more than one route number, federal highways take precedence, according to convention. In those cases where the highway carries two numbered state routes, the lower numbered highway takes precedence.

Because township boundaries are used to designate highway segments, and such segments are not all equal in length, it is necessary to use some type of equalization factor. Otherwise what we tend to measure is the greater opportunity for accidents to occur on a long section of highway as compared with a short section. The equalization factor used is the number of actual miles in the segment to the nearest hundredth of a mile. Mileage is divided into the total number of accidents and a rate expressing the number of accidents per mile of highway derived. Thus, for a stretch of highway 7.23 miles in length that has a total of 22 accidents for the time period under examination, the number of accidents per mile is 3.0428.

If the time periods during which accidents occurred are the same for all segments, we have a rate which is directly comparable for all segments. If, for example, another segment shows a rate of 6.0856 we can say this second segment is twice as likely to have an accident as the first.

The second factor that must be equalized if the different segments are to be directly comparable is the time period during which the data are collected. Any fixed time period, such as a year, may be used, although it should be long enough to allow sufficient accidents to accumulate, yet short enough to reflect current changes.

In the present program it was decided to use a rate based upon the number of accidents per mile of highway per month. The computation of this rate is an extension of the example already given. Let us assume our data cover a 12-month period. We already have the number of accidents per mile of highway, $22 \div 7.23 = 3.0428$. We now divide by 12 and obtain $(3.0428 \div 12 =) .2535$. The decision to use a rate based on the number of accidents occurring per mile of highway per month was based on the need for flexibility. With such a rate the highway system may be examined as often as once a month to determine whether there have been any changes in the accident pattern. It also permits the use of data extending over a variable length of time such as 12 or 18 months, since the rate reflects monthly experience and provides a basis for determining when the accident experience on a given segment has changed sufficiently to warrant attention.

One excellent way of determining whether the accident rate on a given highway segment is undergoing real change, as opposed to chance variation, is to use a method which corresponds to taking the average of a series of monthly rates. This concept may be slightly difficult to grasp at first so a few simple examples may help. Let us take a highway segment at random from somewhere in the state highway system. Assume that the segment we have selected is 5.29 miles in length. During January this segment had a total of 14 accidents, producing an accident per mile per month rate of 2.6465, computed by $(14 \div 5.29) = 2.6465$.

$$\frac{}{1}$$

You will note that we divide the mileage rate by 1 since there was only 1 month in the sample.

If we compute the rate for this segment for February, March, April, and May as the data become available we might have the following set of computations:

$$\text{February } 18 \div 5.29 = 3.4026$$

$$\frac{}{1}$$

$$\text{March } 9 \div 5.29 = 1.7013$$

$$\frac{}{1}$$

$$\text{April } 12 \div 5.29 = 2.2684$$
$$1$$
$$\text{May } 22 \div 5.29 = 4.1588$$
$$1$$

We now have five rates, based on the number of accidents per mile of highway for five different months on the same segment of highway. None are the same and the extreme differences extend from a rate of 4.1588 in May to a rate of 1.7013 in March. We would suspect that what we see here are normal changes in accident occurrence due to differences in seasonal traffic flow, weather, and chance factors.

From a practical standpoint we are more concerned with real changes than with those that result from recognized and uncontrolled factors such as weather and season. One way that we might determine what the true rate on a given segment should be is to take an average of several monthly rates. In our example:

January	2.6465
February	3.4026
March	1.7013
April	2.2684
May	4.1588
Total	14.1776

We may now compute the average as:

$$\text{Average} = 14.1776 \div 5 = 2.8355$$

Thus, we have a rough representative measure of the true rate of the segment that takes into account both the high and low values in the series.

As a practical matter there is a method which accomplishes the same purpose in a slightly different and, for our purpose, easier manner. Returning to our example, instead of computing the accidents-per-mile rate each month we could have added all the accidents for each month together, divided by the mileage, and then by the number of months involved. Let us see how this works:

$$14 + 18 + 9 + 12 + 22 = 75 \text{ Total Accidents}$$
$$75 \div 5.29 = 2.8355$$
$$5$$

If you will compare this answer with the one obtained, calculating the average rate from each month separately, you will note the answer is the same.

If we extend the number of months in the sample to 12, 18, or even 24 months, we get a rate which is more representative of the true accident density than when we use only a month taken at random. We may now illustrate an application of this principle which is used in the method under discussion.

By selecting an arbitrary time period (in our example five months) we may employ what statisticians refer to as a moving-average method of picking out real changes that occur in the accident experience on individual highway segments. Returning once more to our example, we have already computed the average accident rate per mile per month, using the 5 months January to May, as follows:

$$14 + 18 + 9 + 12 + 22 = 75$$
$$75 \div 5.29 = 2.8355$$
$$5$$

When the number of accidents for June becomes available, we may repeat the process dropping the month of January and replacing it with June. Working this out in detail and assuming that we have 20 accidents in June we get:

$$14 + 18 + 9 + 12 + 22 + 20 = 95 - 14 = 81$$
$$81 \div 5.29 = 3.0624$$
$$5$$

You will note that we added the number of accidents for June (20) and subtracted the number that occurred in January (14), giving us a new average for the most recent 5-month period. Since these averages are far more stable than individual monthly rates, large changes between one period and the next may be regarded with a somewhat greater degree of suspicion. What constitutes a large change must be decided by an evaluation of the behavior of accidents in the system under study. In the program we are discussing any change in rate between periods in excess of .3000, plus or minus, is considered grounds for taking a special look at the segment involved.

Data Format

In Wisconsin the standard procedure is to examine the entire highway system every 3 months to determine whether any changes have taken place. The length of time covered is the most recent 24-month period. Each time the system is examined the program automatically adds the most recent 3 months and deducts the oldest 3 months, thus providing a picture of the relative distribution of accidents during the most recent 24 months, as well as changes in the individual segment.

Each segment of highway is represented by a single IBM card which contains the following information:

1. The number of accidents for each 3-month period broken into fatal, personal injury, and property-damage categories contained in columns 6 to 46.

2. The number of miles in the segment in columns 47-50.

3. The total number of accidents by each severity class for the most recent 24 months as follows:

   a. Fatals—cols. 51-52
   b. Personal Injuries—cols. 53-55
   c. Property Damage—cols. 56-59

4. The rates for the most recent 24 months by the following severity classes:

   a. Fatal and Personal Injury combined—cols. 61-63
   b. Property Damage—cols. 64-66
   c. Total Accidents—cols. 67-70

5. The identification of the particular location as follows:

   a. Route Number—cols. 71-73
   b. Section Number—cols. 74-76
   c. County—cols. 77-78
   d. Township—cols. 79-80

Each card is interpreted so that the information desired appears printed on the top of the card. Cards are filed by route number in order, beginning at one end of the route and extending to the other. For example, the cards for highway 41 would appear as follows:

Highway #	*Section*	*County*	*Township*
41	1	Kenosha	Heath
41	2	Kenosha	Ames
41	3	Kenosha	Pleasant
41	4	Racine	Lancaster
etc.	etc.	etc.	etc.

Highway sections are filed in sequence from south to north and east to west, whichever is appropriate. These files serve as a ready reference to the accident history of any segment(s) of highway in the state.

Program Operation

Every 3 months the accident experience for the current period is punched into columns 1-5 of the master card. When the current data for all segments have been added the cards for the entire highway system are fed into a 650 computer at the rate of 80 per minute. As each card goes through the computer, the following operations are performed:

1. The oldest quarterly data are subtracted from the total accident-by-severity category and the most recent 3-month data are added to the totals and placed in the proper position in an output card.

2. New accident rates consisting of the number of accidents per month per mile of highway are computed using the current data, and placed in their proper position in a new card.

3. The quarterly accident totals are moved to new positions in the output card with the oldest quarter being dropped and the others moved five positions to the right into their proper location and placed in the new card.

4. The new rates based on the 24-month moving average are compared with the old rates to determine whether there has been a change large enough to require special attention.

5. If there has been a change large enough, it punches out a specially-marked card giving the following information:

   a. Present rates
   b. Previous rates
   c. Amount of change, plus or minus
   d. Complete identification as to location

6. In either event it punches out a card containing the same data in the same form as the original card, except that the data are current. This card then goes into the file and is used both as a reference source and as input for the next examination of the highway system.

This entire operation, including the punching of the new cards, takes approximately ¾ of a second, making it possible to process 80 highway segments per minute. When the operations are complete, the special cards indicating changes have taken place can be sorted out and listed mechanically for special examination.

A work-saving feature of this system is that the new output cards are ready to be used as input for the next examination of the system merely by placing the next 3 months data, when available, in columns 1-5. This may be done manually or by means of a mechanical tabulating setup, depending on the volume of cards to be processed.

Uses of Data

The most important advantage that such a system gives is the wide flexibility made possible by mechanical methods. Each card in the system provides a ready reference for a particular segment of highway, providing a history of experience for 24 months, as well as current rate data. Any single segments may be located quickly, and their present condition and past behavior examined.

The use of special output cards for segments which have shown sufficiently large changes in their basic rates insures that trouble spots are automatically brought to the attention of the planner and administrator without tedious manual examination of a large number of cards or poring over maps of the highway system.

In addition, because the data are already in punched-card form, a great variety of operations can be performed quickly with mechanical and electronic equipment. Some of the more useful things that can be done are:

1. Segments can be sorted into order and mechanically listed in order of severity from the worst to the best.

2. All highway segments that have a rate higher than an arbitrarily selected one can be sorted out and examined using mechanical sorting equipment.

3. All the current rates on a given highway may be listed by mechanical means to give a profile of the accident density on the highway.

This program, now operational, is flexible enough that with minor modifications it can be made to fit a variety of specific needs. For example, the following modifications can be made:

1. Rates can be based upon mileage traveled rather than miles of highway, assuming volume data are available.

2. Computation may be based upon any desirable time period such as the previous 6 months, year, or 5 years.

3. The program may be modified to select only changes that occur above an arbitrary level, such as a 5 per cent or 10 per cent increase, for special consideration.

4. The system may be searched and new rates computed as frequently as every month depending upon individual needs and desires.

This program emphasizes but one of the many ways in which modern data-processing systems can provide better information upon which to base decisions. The success of this system prompted us to begin work on a more complicated and flexible system for analyzing accident distributions on street and highway networks. The new program now in the testing stage uses more sophisticated analytical techniques. It has built-in sub-routines for adding factors such as volume, at the option of the user. It permits selection of street and highway sections that have unusual experience as compared with other segments on the same or adjacent highways. It makes it possible to recognize and pick out significant changes over time. Like its predecessor, this program will have flexibility of input and output to reduce the amount of manual labor involved to a minimum.

If we are to record true progress in the field of highway operation, every advantage must be taken of new technological developments. It would seem that we have not yet begun to tap the potential benefits of computers and their application to the growing problems of motor vehicle traffic supervision. These problems will continue to increase and change with the development of new, more elaborate controlled-access highways. We have a chance to meet these problems as they develop, if we take full advantage of the potentials of mechanical computation.

Factors Influencing Severity of Illinois School Bus Accidents

PROBLEM

During the 1958 calendar year, 388 motor vehicle traffic accidents involving a school bus outside of metropolitan Chicago were reported to the Illinois Division of Highways. When accidents occurring only while transporting school children were counted, this number decreased to 267 for the entire State of Illinois. Occupants of school buses injured as a result of reported accidents numbered 135. For purposes of this study only those accidents in the last-named category will be analyzed in detail.

The fact that 388 school buses were involved in a reported motor vehicle accident cannot be passed on lightly, even though they were or were not transporting school children at the time. Putting such a record on the basis of accidents per school bus for the year shows that 43.1 buses per 1,000 were involved in a reported accident. In contrast to this record all commercial vehicles had a comparable rate of 39.9 accidents per 1,000 vehicles in 1958. Adjustment for mileage raises the school bus accident rate per 1,000 vehicles to 70.1. Average annual vehicle miles traveled by each school bus is considered to be about 61.5 per cent of that of a commercial vehicle.

The purpose of this study was to ascertain the types of accidents in which school bus drivers were involved, where the accidents occurred, and subsequent degrees of accident severity. Additional compilations were made with respect to age and sex of the injured; age and sex of the drivers; weather, road and surface conditions; and other contributing circumstances.

With school bus drivers becoming involved in a greater number of accidents than their counterparts in commercial transportation, the question is asked: How can this situation be alleviated? It would be hoped that a school bus driver would generally be a safer driver than the commercial driver and certainly more competent than the average motor vehicle operator.

The objective of the present study is to clearly analyze the school bus accident situation for 1958 in an attempt to point up ways and means school bus operators can improve their driving habits with such a valuable cargo as they transport.

Four specific hypotheses were postulated. They may be stated in the null form as follows:

1. There is no difference among the location categories; namely, numbered routes, municipal streets and county and local roads; with respect to average number of school bus occupants injured per injury accident.

2. There is no difference among the location categories; namely, numbered routes, municipal streets and county and local roads; with respect to average number of occupants of vehicles other than a school bus injured per injury accident.

3. The age distribution of drivers involved in school bus accidents is not different from that of all Illinois licensed drivers.

4. School bus drivers are involved in no more accidents of varying degrees of severity while transporting school children than other drivers would be, based on representation in accidents of this vehicle type.

METHOD

All reports of motor vehicle traffic accidents involving a school bus during the calendar year of 1958 were obtained from the accident record files in the Illinois Division of Highways. The reports were sorted and grouped according to whether or not the school bus was transporting school children at the time it was involved in an accident and only those that occurred while the school bus was transporting children were tallied. The remaining reports were returned to the file.

Two hundred sixty-seven reports covering three fatal, 83 injury-producing and 181 property damage only school bus accidents were selected for the study. The provided data with respect to three fatalities, 190 injured persons and 512 motor vehicle operators. Included among the vehicle operators were 265 school bus drivers.

Comparisons were made among the various location categories for each variable considered. Similar comparisons were made with respect to accident severity both within and among location categories. Where apropos, statistical techniques were applied to determine the significance of differences observed in the data.

The chi square test was used to determine whether the frequencies in the various categories were significantly different from those which would result if only chance factors were operating. In determining the expected frequency distributions of persons injured in school buses and other vehicles by location of accident, percentage distributions were calculated for personal-injury accidents and applied in both instances to obtain the chi square results.

The percentage distribution of drivers by age group was calculated from driver population data as obtained from the Drivers License Division, Office of the Secretary of State, State of Illinois. The data are presented in Table I and were used as a basis for caulating expected frequency of drivers in respective age groups from among those involved in the accidents included in this study. Because the expected frequency fell below five for drivers under 20 and those over 75 years of age, each was combined with the next age group before applying the chi square test. This resulted in a decrease of two degrees of freedom from that indicated in Table I.

RESULTS

Accidents and Injuries

A tabulation showing number of accidents by location and severity involving a school bus while transporting school children is contained in Table II.

Prepared by Bureau of Traffic, Division of Highways, State of Illinois

TABLE I

Number of Motor Vehicle Drivers by Age and Sex in Illinois—1958*

	DRIVERS					
	Total		Male		Female	
Age Group	Number	Per Cent	Number	Per Cent	Number	Per Cent
Under 20..	274,500	6.1	171,000	3.8	103,500	2.3
20-24	423,000	9.4	252,000	5.6	171,000	3.8
25-34	931,500	20.7	535,500	11.9	396,000	8.8
35-44	1,044,000	23.2	598,500	13.3	445,500	9.9
45-54	886,500	19.7	540,000	12.0	346,500	7.7
55-64	598,500	13.3	400,500	8.9	198,000	4.4
65-74	283,500	6.3	216,000	4.8	67,500	1.5
75 & Older	58,500	1.3	49,500	1.1	9,000	0.2
TOTAL ..	4,500,000	100.0	2,763,000	61.4	1,737,000	38.6

*Based on a sample of 3,135,739 licenses issued. Illinois licensed drivers estimated at 4,500,000 in 1958.

TABLE II

Reported Motor Vehicle Traffic Accidents Involving School Bus While Transporting School Children by Severity and Location—Illinois 1958

	NUMBERED ROUTES		MUNICIPAL STREETS		COUNTY AND LOCAL ROADS	
Severity	No.	Per Cent	No.	Per Cent	No.	Per Cent
Fatal	1	1.2	1	0.9	1	1.3
Injury	26	32.1	31	28.2	26	34.2
Property Dam..	54	66.7	78	70.9	49	64.5
TOTAL	81	100.0	110	100.0	76	100.0

Fatal, injury and property damage only accidents were divided about equally among the three location categories indicated. A further study of the table indicates that a greater percentage of accidents occurring on county and local roads resulted in death or injury.

The number of injury accidents by location, together with the number of school bus occupants and occupants of other vehicles injured therein, is shown in Table III.

TABLE III

Reported Injury Motor Vehicle Traffic Accidents Involving School Bus While Transporting School Children and Persons Injured by Location of Accident—Illinois 1958

LOCATIONS	ACCIDENTS	NUMBER OF PERSONS INJURED		
		School Bus	Other Vehicle	Total
Numbered Routes	26	20	28	48
Municipal Streets	31	19	32	51
County and Local Roads.....	26	64	11	75
TOTAL	83	103	71	174

When the injured persons for whom age was not stated are excluded, the data shows that 82 per cent of injured school bus occupants were 14 years of age or younger and 80 per cent of the injured occupants of other vehicles were 20 years of age or older.

A chi square test of the significance of differences among location categories in frequency of personal injury by occupants of school buses involved in reported Illinois motor vehicle traffic accidents while transporting school children resulted in a value significant beyond the one per cent level of confidence with two degrees of freedom.

In computing chi square the number of expected injuries of school bus occupants and those of other vehicles was calculated as being in the same ratio as the actual occurrence of injury accidents by the location categories. These percentages were 31, 38 and 31, for state numbered routes, municipal streets and county and local roads, respectively.

A similar test to determine the statistical significance of differences among location categories in frequency of personal injuries by occupants of vehicles other than school buses in reported Illinois motor vehicle traffic accidents involving a school bus while transporting school children, resulted in a value significant at the two per cent level of confidence with two degrees of freedom.

Evidence is sufficient to indicate that there is a difference among the location categories with respect to number of school bus occupants as well as occupants of vehicles other than a school bus injured per reported injury accident. Both the first and second null hypotheses were rejected at the two per cent level of confidence or beyond.

Drivers of Vehicles Involved

Failure to yield right-of-way, speed too fast for conditions, and following too closely, in the order listed were the circumstances most frequently contributing to reported injury motor vehicle traffic accidents involving a school bus while transporting school children in Illinois during 1958. School bus drivers were responsible for 62 per cent of all the injury accidents due to failure to yield right-of-way, 55 per cent due to speed too fast for conditions and 71 per cent of the ones due to following too closely.

The number of school bus and other vehicle drivers in reported motor vehicle traffic accidents involving a school bus while transporting school children by age of driver and severity of accident is given in Table IV. The per cent distribution of drivers by age group in Illinois has been presented in Table I, and was used as a basis for calculating the expected frequency of drivers in the respective age groups from among those involved in accidents included in this study. Tests of significance of the differences between observed and expected frequency of drivers in the various age groups in reported motor vehicle accidents involving a school bus while transporting school children in Illinois during 1958 were made.

The age distribution of drivers involved in the accidents included in this study, with the exception of drivers of vehicles other than a school bus involved in injury accidents, was not necessarily the same as would be expected from the per cent distribution of all Illinois licensed drivers by age group. All of the differences except as noted above were statistically significant at the five per cent level of confidence or beyond.

A signifiance test using the Leslie modification of chi square revealed no significant difference between drivers of school buses and those of the other vehicles included in this study with respect to the severity of accidents in which they were involved.

DISCUSSION

There are certain limitations and inferences made in the study that must be recognized because of the nature of the data available and the methods of treatment.

TABLE IV

Number of Drivers in Reported Motor Vehicle Traffic Accidents Involving School Bus While Transporting School Children by Severity of Accident—Illinois 1958

Age Group	PROPERTY DAMAGE ONLY			INJURY			FATAL			ALL		
	School Bus	Other Vehicle	Total	School Bus	Other Vehicle	Total	School Bus	Other Vehicle	Total	School Bus	Other Vehicle	Total
Under 20	1	27	28	—	10	10	—	—	—	1	37	38
20-24	10	18	28	5	6	11	—	1	1	15	25	40
25-34	32	30	62	17	16	33	1	—	1	50	46	96
35-44	41	26	67	30	16	46	1	1	2	72	43	115
45-54	40	18	58	12	11	23	—	—	—	52	29	81
55-64	32	17	49	12	9	21	1	—	1	45	26	71
65-74	4	11	15	1	3	4	—	—	—	5	14	19
75 and over	—	1	1	—	—	—	—	—	—	—	1	1
TOTAL DRIVERS	160	148	308	77	71	148	3	2	5	240	221	461

1. It was assumed that the number of persons injured should be in direct proportion to the number of injury accidents involved in by the school bus drivers while transporting school children to and from school.

2. An equivalent assumption was projected to the injury accidents involved in by other drivers.

3. The supposition was made that the representation of age groups involved in the type of accidents under study were equally exposed to the probability of such an occurrence.

4. The expected frequency of all drivers involved in a reported accident implicating a school bus while transporting school children to and from school was based on equal exposure of all drivers.

As would be expected the ages of the injured were younger for school bus occupants than for the occupants of other vehicles. Eighty-two per cent of the former were under 15 years of age whereas 80 per cent of the latter were age 20 years or older.

Failure on the part of one or more of the drivers to yield the right-of-way, speed too fast for conditions and following too closely were, in the order listed, most frequently indicated as the circumstance considered to have contributed to the accidents. School bus drivers were the greatest offenders. In the case of injury-producing accidents they were deemed responsible for 62 per cent of those due to a right-of-way violation, 55 per cent of the ones attributed to speed too fast for conditions and 71 per cent of those due to following too closely.

In view of statutory provisions for the safety of school buses and their passengers, the limited number of miles they travel during a 180-day academic year, the time of day of their operation, among other conditions providing for a minimum of exposure, the school bus driver's record was not the most enviable.

SUMMARY

The objective of this study was to analyze Illinois school bus accident reports for a single year, 1958, in an attempt to identify factors associated with accident severity. Data were compiled with reference to drivers; severity in terms of property damage only, number of persons injured and number of persons killed; location of accident and contributing circumstances.

Four specific hypotheses were formulated and tested to determine whether or not location of accident and age of driver were associated with accident severity.

Results of the study indicate that there is a difference among state numbered routes, municipal streets, and county and local roads with respect to the number of school bus occupants injured per injury accident. Accidents that occurred on county and local roads seemed to be the most severe in this respect. Too often the school bus was the only vehicle involved in the accident at these locations.

The general conclusions from this study, within the limitations of the data, and when only injury accidents, persons injured and the school bus drivers involved are considered, are as follows:

1. Accidents occurring on country and local roads tend to be more severe in terms of number of school bus occupants injured per injury accident than those occurring on either state numbered routes or municipal streets.

2. Even though this study takes into consideration an involvement record for a single year only, evidence is sufficient to indicate that perhaps school bus drivers should be chosen with greater care.

3. A program of supplemental training for school bus drivers should include among other provisions a study of accident types and locations of greatest severity with regard to averting future implications.

4. The type and number of violations committed, particularly on the part of school bus drivers, resulting in injuries to school bus occupants should be stressed as a cause responsible for a large portion of their accidents.

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A Survey of Motorists' Vision Requirements

by Richard P. Crinigan, Jr.

The purpose of this survey was to determine the type of tests and the passing standards that are required by the various states. It was considered desirable that information be gathered relative to the requirements for issuance of an original license as well as the standards, if any, for renewal of that license. In addition we wished to determine if there was any program for re-examination of vision of certain classes of drivers such as accident repeaters or those in certain age groups.

Questionnaires were sent to the chairman of the Committee on Motorists' Vision and Highway Safety of the affiliated state associations and the District of Columbia. Of the forty-nine associations receiving these questionnaires, forty filled them out and returned them. In all states that were covered some test of vision is required before issuance of an original license in that state. South Dakota was the last to license drivers after examination; their law went into effect July 1, 1959.

The vision tests that are given will vary from a simple test of visual acuity on a wall chart to instrument tests that measure phorias, stereopsis and visual fields. All states make a test of visual acuity in some form, either with a wall chart of with some form of stereoscopic instrument. The most commonly required passing standard is 20/40 visual acuity. There is a range of requirements from 20/25 to 20/70. No state reporting in this survey will license a person who has less than 20/70 visual acuity in at least one eye on original application. Four states require better visual acuity unaided than they require for issuance of a license restricted to the holder wearing glasses. Several states require better acuity from the one-eyed driver than from the two-eyed. A complete breakdown of the visual functions tested and the means for this testing is given in Columns 2A and 2B for private operators and for commercial drivers, upon original application. Columns 3A and 3B give the minimum visual requirements for original license as an operator and chauffeur respectively.

Inspection of these columns will show that 18 states make a test of color perception. Many of these states do not disqualify an applicant for deficient color vision. It is apparently tested so that the applicant can be warned to make allowances for this defect when it exists.

Depth perception tests, usually in the form of instrument stereopsis tests, are required of operator applicants in 14 states. All of these states, and one additional one, require these tests for chauffeurs. Many of the replies did not specify a definite standard for this skill. Thus, it must be inferred that poor performance on this test is not cause for outright rejection, but is rather used to bring about a complete professional vision examination.

Four tests make some test of lateral and/or vertical phorias. Here, too, definite pass-fail standards are not reported. These tests, like depth perception tests, are apparently used as cause for referral for a professional vision examination.

There are three states that make some form of test for fusion.

SUMMARY OF MOTORISTS' VISION REQUIREMENTS

1. State	Original Application				Regular Periodic Retest						Special Retest					
	2. Test Used		3. Passing Standards		4. Retest Given		5. Test Used		6. Passing Standards		7. Acc. Rep.	Age Grp.	8. Test Used		9. Passing Standards	
	Opr.	Chf.	Operator	Chauffeur	Opr.	Chf.	Opr.	Chf.	Opr.	Chf.	Trs.		Opr.	Chf.	Opr.	Chf.
	A.	B.	A.	B.	A.	B.	A.	B.	A.	B.	A.	B.	A.	B.	A.	B.
Alabama	W	W	20/40	20/40	No	No	—	—	—	—	Yes	No	As 2A	As 2B	As 3A	A 3B
Arizona	A&C In O&T		20/40 See Note #1	20/40	3 yr.	2 yr.	As 2A	As 2B	As 3A	As 3B	Yes	Yes	As 2A	As 2B	As 3A	As 3B
Arkansas	NO REPORT															
California	NO REPORT															
Colorado	A and C W		20/40 Color Normal	20/30	3 yr.	1 yr.	As 2A	As 2B	As 3A	As 3B	Yes	Option	O and T		As 3A	As 3B
Connecticut	T& W	T& W	20/40 (20/30 if one eyed)	20/40	No	No	—	—	—	—	Yes	See #2	As 2A	As 2B	As 3A	As 3B
Delaware	A and C in T		20/40	20/40	No	No	—	—	—	—	Yes	Yes	As 2A	As 2B	As 3A	As 3B
Dis. of Col.	A&C	A&C	20/40 in each eye See signal colors		No	No	—	—	—	—	See #3	Ovr 65	As 2A	As 2B	As 3A	As 3B
Florida	W	W	20/40	20/40	No	No	—	—	—	—	Yes	No	As 2A	As 2B	As 3A	As 3B
Georgia	A-C-D in S		20/40 in one eye	20/40 in one eye	No	No	—	—	—	—	Yes	See #4	As 2A	As 2B	As 3A	As 3B
Idaho	W	W	20/50 without Rx 20/70 with Rx (Day)		2 yr.	1 yr.	As 2A	As 2B	As 3A	As 3B	—	—	—	—	—	—
Illinois	MODIFY ORTH-R		20/40 either eye	20/40 either eye	No	No	—	—	—	—	Yes	Ovr 70	As 2A	As 2B	As 3A	As 3B
Indiana	A in S	A	20/40	20/40	4 yr. (Over 45 2 yr.)	4 yr.	As 2A	As 2B	As 3A	As 3B	Yes	See 4A	As 2A	As 2B	As 3A	As 3B
Iowa	MODIFY TELEB		20/40 Both eyes even if monoc. is 20/70		2 yr.	1 yr.	As 2A	As 2B	As 3A	As 3B	—	—	—	—	—	—
Kansas	A in T	A	20/50	20/40	No	No	—	—	—	—	Yes	No	As 2A	As 2B	As 3A	A 3B
Kentucky	A-L-V-&D		20/40	20/40	No	No	—	—	—	—	No	No	—	—	—	—
Louisiana	T& W	T& W	20/40	20/30	No	No	—	—	—	—	No	No	—	—	—	—
Maine	T-A	T-A	20/40	20/40	No	No	—	—	—	—	See #5	Ovr 80 1 Yr.	As 2A	As 2B	As 3A	As 3B
Maryland	W& T	W& T	20/70	20/70	No	No	—	—	—	—	See #6	Note	As 2A	As 2B	As 3A	As 3B
Massachusetts	A-C-D-P in S		20/40 Field 120° Color Normal		No	No	—	—	—	—	Yes	No	As 2A	As 2B	As 3A	As 3B
Michigan	W	W	20/40	20/40	3 yr.	1 yr.	As 2A	As 2B	As 3A	As 3B	Yes		T	T	No set st'ds.	
Minnesota	A-C-D in T		20/40 (See Note #7)	20/40	No	1 yr.	—	As 2B	—	As 3B	Yes Note	See #7	As 2A	As 2B	As 3A	As 3B
Mississippi	A-C-D in O		20/30	20/30	No	No	—	—	—	—	Yes	Yes	As 2A	As 2B	As 3A	As 3B
Missouri	A-C-D-F in T		20/50	20/50	No	No	—	—	—	—	No	No	—	—	—	—

SUMMARY OF MOTORISTS' VISION REQUIREMENTS—CONTINUED

	Original Application				Regular Periodic Retest						Special Retest					
1. State	2. Test Used		3. Passing Standards		4. Retest Given		5. Test Used		6. Passing Standards		7. Acc. Rep.	Age Grp.	8. Test Used		9. Passing Standards	
	Opr.	Chf.	Operator	Chauffeur	Opr.	Chf.	Opr	Chf.	Opr.	Chf.	Trs.		Opr.	Chf.	Opr.	Chf.
Montana	A-C-D in T		20/40 Best eye	20/40	No	No	—	—	—	—	Yes	Yes	As 2A	As 2B	As 3A	As 3B
Nebraska	A-L-V-D &F in T		20/40 on acuity Fail 2 others; refer for profess. exam.		No	No	—	—	—	—	Yes	No	As 2A	As 2B	As 3A	As 3B
Nevada	NO REPORT															
New Hamp.	A-M-D-C &P		20/40	20/40	No	No	—	—	—	—	Yes	Ovr 80	As 2A	As 2B	As 3A	As 3B
N. Jersey	NO REPORT															
N. Mexico	NO REPORT															
New York	C-A with O, T&W		20/40	20/40	No	No	—	—	—	—	Yes	No	As 2A	As 2B	As 3A	As 3B
N. Carolina	A-C&D		20/40 & Read Road Signs		4 yr.	1 yr.	As 2A	As 2B	As 3A	As 3B						
N. Dakota	NO REPORT															
Ohio	A-C &D	A-C &D	20/40 (20/70 restricted)	20/40	No	No	—	—	—	—	Yes	No	As 2A	As 2B	As 3A	As 3B
Oklahoma	NO REPORT															
Oregon	NO REPORT															
Penn.	A-C&D in T		20/40 See Note #8	20/40	No	No	—	—	—	—	Yes	No	As 2A	As 2B	As 3A	As 3B
Rhode Island	A-P	A-P	20/40 115° Total	20/20 Best 20/30 other eye 115° each eye	No	No	—	—	—	—	No	Over 70	A	20/40	A	20/40
So. Carolina	W	W&S	20/40 without Rx 20/70 with glasses		No	No	—	—	—	—	No	No	—	—	—	—
S. Dakota	A-C-D in T		20/40	20/40	No	No	—	—	—	—	Yes	No	A	20/40	A	20/40
Tennessee	A-L AVD in T	&C in T	20/30 Unaided 20/50 With Rx		No	No	—	—	—	—	Yes	No	As 2A	As 2B	As 3A	As 3B
Texas	A	A	20/40 Unaided 20/50 With Rx		No	No	—	—	—	—	Yes	No	As 2A	As 2B	As 3A	As 3B
Utah	W	W	20/40 (20/60 Restricted)	20/40	5 yr.	5 yr.	As 2A	As 2B	As 3A	As 3B	No	No	—	—	—	—
Vermont	A-C-F-P in T		20/50 if two eyed 20/25 if one eyed 120° Binoc or 100° Monoc		No	No	—	—	—	—	Yes	No	(DVS SERIES)		As 3A	As 3B
Virginia	A-C-D-L &V in T		Under 55 20/70 each Over 55 20/40 each (See Note #9)		No	No	—	—	—	—	Yes	No	As 2A	As 2B	As 3A	As 3B
Washington	W	W	20/70	20/70	2 yr.	2 yr.	As 2A	As 2B	As 3A	As 3B	No	No	—	—	—	—
W. Virginia	W	W	20/40 & Signal Colors		No	No	—	—	—	—	No	No	—	—	—	—
Wisconsin	NO REPORT															
Wyoming	A	A	20/40	20/40	No	1 Yr.	—	A	—	20/40	Optional		A	A		20/40

When it comes to re-examining the vision of a driver after he has received his first license, there is a wide variation of requirements. These requirements would vary from those states that report there is no provision for re-testing vision for any of the reasons or groups we covered in our survey to those states that report a regular re-testing program. Nine states re-test the vision of private operators on a regular basis for the renewal of their license. The interval between these mandated tests ranges from two years to five years. Eleven states require vision tests to renew chauffeur licenses. Nine of these 11 are the ones that require a re-test of vision for an operator. The interval between vision tests for chauffeurs varies from one to five years.

Eleven of the states responding reported that they make some distinction between various age groups in their vision re-testing program. One state (Indiana) reports that drivers over 45 are re-examined at shorter intervals than their younger counterparts in the regular re-testing program. The other states reporting special re-tests because of age generally require certain age groups to be tested in the absence of a general re-testing program. The minimum ages in these special groups will vary from 45 to 80 years of age. The testing interval varies from 1 to 5 years.

The greatest agreement on re-testing of vision seems to be with accident repeaters. Twenty-five states require "accident repeaters" to be re-tested, and several other states make this re-testing optional. It was not the purpose of this survey, however, to determine what constitutes an "accident repeater" in the various states. We can assume, however, on the basis of other driving requirements, that an "accident repeater" in one state would not be so considered in all states.

The standards required for passing on re-test of vision are generally the same as those required by the state for an original applicant. This is true whether the state requires the re-test for accidents, age or as part of a general program. There are a few states, however, that have different requirements for "accident repeaters" than they have for others.

As a result of this survey, the following suggestions come forth:

1. That efforts to upgrade the vision standards be continued.

2. That greater efforts be made toward establishing uniform requirements throughout the country. This might be possible through a cooperative effort with the American Association of Motor Vehicle Administrators or as an appendix to the Uniform Vehicle Code. It is suggested as an appendix rather than as part of the code so that it can be updated if needed. If these methods prove to no avail, individual efforts toward more widespread acceptance of the AOA standards should continue.

3. There are no states that at present make any test of vision under night-time conditions according to our replies. It is to be hoped that research into the subject will prove fruitful, and suitable testing devices and standards will ensue.

KEY TO CODE APPEARING IN COLUMNS 2A & 2B "TEST USED"

A — Acuity test
C — Color perception test
D — Depth perception test
F — Fusion test
L — Lateral phoria test
M — Motility test
P — Visual field test
V — Vertical phoria test

TESTING DEVICE

O — Ortho-Rater
S — Sight Screener
T — Telebinocular
W — Snellen Wall Chart

NOTES TO DATA APPEARING ON SUMMARY SHEET

#1 Arizona—Operator with 20/60 restricted license; daylight only.

#2 Connecticut—Drivers who drive in an erratic manner and are reported to the Motor Vehicle Bureau.

#3 District of Columbia—For permit revocees before re-issue: AAA Test of Acuity under low illumination and depth perception. Use AAA standards—20/40 acuity.

#4 Georgia—Re-examine those suspected of physical or mental inadequacies. Also, anyone may be called in at any time.

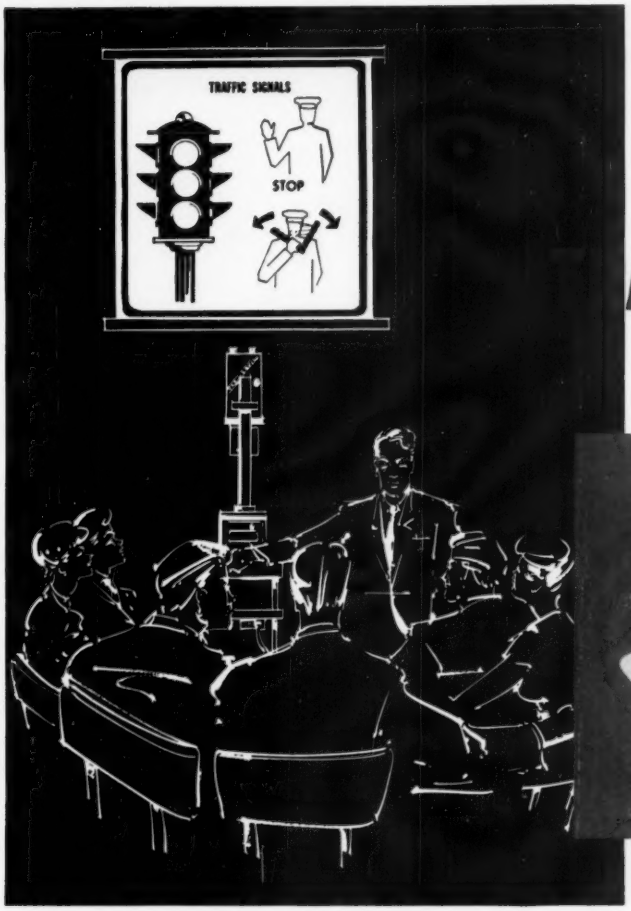
#5 Maine—Accident repeaters have field of vision checked—140° required.

#6 Maryland—Re-exam at request of insurance companies.

#7 Minnesota—If acuity is less than 20/40, license issued is restricted as to speed, time and/or place at examiner's judgement. Vision re-examined on change of address.

#8 Pennsylvania—Must have 20/30 to drive without glasses. 20/40 allowed with glasses. 20/50 restricted to daylight only.

#9 Virginia—Under 55, if one eye less than 20/70, other must be 20/40 or better . Over 55, if one eye is less than 20/40, other must be 20/20 or better.



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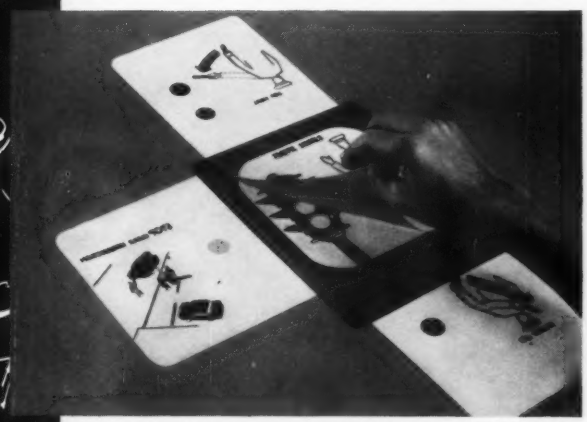

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